

CITY OF CERES GENERAL PLAN

BACKGROUND REPORT

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INTRODUCTION

This document contains background information compiled for the City of Ceres General Plan Update. The report addresses all the significant issues to be addressed in the Plan and will also serve as the "environmental setting" portion of the environmental impact report that will be prepared on the *General Plan*. It is organized into ten chapters, as follows:

- Chapter 1: Land Use
- Chapter 2: Urban Form and Design
- Chapter 3: Population
- Chapter 4: Economic Conditions and Fiscal Considerations
- Chapter 5: Transportation
- Chapter 6: Public Facilities and Services
- Chapter 7: Recreational and Cultural Resources
- Chapter 8: Natural and Agricultural Resources
- Chapter 9: Safety
- Chapter 10: Noise

Appendix A of the report is a Community Concerns Summary Report that summarizes the results of an intensive effort to identify public opinions on issues related to the General Plan.

Each chapter contains a discussion of the subject matter, followed by a summary of the key findings of the chapter. Maps are included in most chapters to generally illustrate information described.

The *Background Report* was prepared by a multi-disciplinary consulting team headed by J. Laurence Mintier & Associates. Mintier and Associates was responsible for preparing Chapter 1, *Land Use*, Chapter 2, *Urban Form and Design*, Chapter 3, *Population*, the cultural resources section of Chapter 7, *Recreational and Cultural Resources*, and Chapter 7, *Safety*. Lord & Associates was responsible for preparing Chapter 4, *Economic Conditions and Fiscal Considerations*. Dowling Associates was responsible for preparing Chapter 5, *Transportation*. Lew-Garcia-Davis was responsible for preparing Chapter 6, *Public Facilities and Services*, and the parks section of Chapter 7, *Recreational and Cultural Resources*. H. T. Harvey & Associates was responsible for preparing most of Chapter 8, *Natural and Agricultural Resources*, except for the water resources section prepared by William Vandivere and the air quality section prepared by Donald Ballanti. Brown-Buntin Associates was responsible for preparing Chapter 10, *Noise*. Mintier & Associates was responsible for compilation and editing of the entire report.

The City's adopted *Housing Element* contains detailed background information on housing and household characteristics.

City staff was instrumental in providing data and in reviewing and commenting on earlier drafts of the report. City Planning and Community Development staff prepared the base map used as the source for many of the graphics and prepared a parcel-based land use database used to summarize existing land use information.

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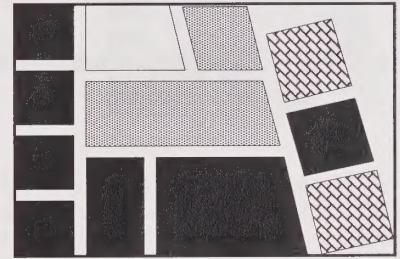
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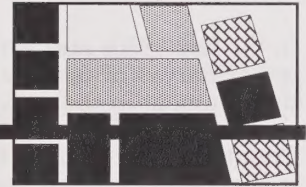
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CHAPTER 1

LAND USE



CHAPTER 1 LAND USE

1.0 INTRODUCTION

Land use is the principal focus of the general plan. This chapter provides a context for the General Plan by describing existing land use conditions and local, regional, state, and federal plans and policies that have a bearing on land use in Ceres. This chapter describes the existing City of Ceres General Plan, zoning, and existing land uses. The chapter also summarizes the Stanislaus County General Plan and City of Modesto General Plan, as they relate to land use in Ceres, and describes the role of LAFCO.

1.1 REGIONAL SETTING

Ceres is located in central Stanislaus County, adjacent to and south of Modesto, the County seat. Ceres is located approximately 75 miles south of Sacramento on State Route 99 and 100 miles east of Oakland via the 5, 205, and 580 freeways. The Tuolumne River runs along the northern edge of Ceres. Figure 1-1 depicts Ceres general location within Stanislaus County and California.

1.2 CITY LIMITS AND STUDY AREA

As of January 1994, Ceres encompasses approximately 5.6 square miles, or 3,580 acres, of incorporated territory. According to a parcel-based land use inventory assembled by the City, approximately 3,000 acres of this area is subdivided land (i.e., excluding streets, canals, easements, and other rights-of-way). Figure 1-2 shows Ceres' city limits. Within the boundaries of its city limits, the City includes several unincorporated islands which remain under County jurisdiction.

For the purposes of the General Plan Update, the City defined a Study Area, also referred to as the "Planning Area," that is bounded by the Tuolumne River on the north, Grayson Road on the south, Carpenter Road on the west, and Washington Road on the east (see Figure 1-2) encompassing approximately 14,700 net acres according to the land use inventory. In addition to all of the incorporated city, the Study Area covers parts of unincorporated Stanislaus County and the city of Modesto. The part of Modesto in the northwest Study Area was included for analytical purposes only (i.e., to evaluate traffic impacts); it is not contemplated as a future part of Ceres.

1.3 HISTORY OF LAND USE PLANNING IN CERES

The City of Ceres was originally laid out by Daniel Whitmore in 1867 and incorporated in 1918. For a detailed description of Ceres' history, see Chapter 7, *Historic and Cultural Resources*.

General planning in Ceres started as a joint project with Stanislaus County and its incorporated cities in 1957 with financing from the U. S. Housing and Home Finance Agency. The program was assigned to the Cities-County Planning Advisory Committee, made up of representatives of the participating agencies. The committee was also responsible for the standardization of subdivision and zoning ordinances, a thoroughfare plan, and a housing survey. By 1961, the Committee had completed plans for all areas of the county; Ceres had adopted a general plan for the Modesto-Ceres-Empire area in 1960, and the County adopted a general plan for all of Stanislaus County.

A comprehensive revision of the 1960 plan was completed in the early 1970s. Preparation of the plan was financed in part by a grant from the U.S. Department of Housing and Urban Development (HUD). As part of the plan, several countywide Environmental Resource Management Elements (ERME) prepared by the Stanislaus Area Association of Governments (SAAG) were adopted. ERME sections included: soils, water, geology and seismic safety, agriculture, recreation/open space, and wildlife and vegetation.

In the 1970s and 1980s, a number of state laws concerning general plans and zoning were passed, including requirements for nine mandatory "elements" (since collapsed into seven elements). In response to these new requirements, the City began to amend and update the plan on an individual element basis. This trend continued through the early 1990s, and the City's existing General Plan consists of several elements, adopted at various times over the last 20 years. To address the fragmentation of the plan and to comprehensively address growth issues in Ceres, in late 1993 the City initiated a comprehensive update of all its general plan elements, except the *Housing Element*.

In the late 1980s and early 1990s, the City also undertook some specialized planning efforts focused on specific areas of the city. In 1989, the City adopted the *Mitchell Road Corridor Specific Plan* to address development in the area around Mitchell Road, a primary link to Modesto Airport, the Beard industrial area, and southern Modesto. (This plan was subsequently amended in 1995.) In 1990, the City and County jointly formed the Stanislaus-Ceres Redevelopment Commission (SCRC), which established a redevelopment project area consisting of two discontinuous subareas, one immediately north of Ceres' city limits and one immediately south, both within Ceres' sphere of influence. In 1991, the City created a redevelopment agency, established a redevelopment project area, and prepared a redevelopment plan for the project area. These plans are discussed in greater detail in later sections of this chapter.

1.4 FORMER GENERAL PLAN

Prior to adoption of this plan, the City of Ceres General Plan consisted of the following nine documents, in the order of their adoption:

1. *Open Space and Agriculture Element*, adopted June 1973
2. *Scenic Highway Element*, adopted November 1977
3. *Land Use Element*, adopted November 1984, as amended through September 1990
4. *Noise Element*, adopted June 1990
5. *Safety Element*, adopted September 1990
6. *Public Facilities Element*, adopted October 1990
7. *Circulation Element*, adopted December 1991
8. *Housing Element*, adopted August 1992
9. *Mitchell Road Corridor Specific Plan*, adopted June 1989

With the exception of the *Housing Element* and the *Mitchell Road Corridor Specific Plan*, these elements were consolidated and superseded through the adoption of the updated General Plan.

1.5 MITCHELL ROAD CORRIDOR SPECIFIC PLAN

State law provides for the preparation of specific plans to implement the general plan, setting forth specific land uses, infrastructure, and public facilities necessary to serve the planned land uses. Specific plans must also include standards and criteria by which development will proceed and implementation measures including regulation, programs, public works projects, and financing measures necessary to carry out the specific plan (*Government Code 65451(a)*). Specific plans must be consistent with the general plan.

The Mitchell Road Corridor is defined as the area along Mitchell Road on the eastern side of Ceres from State Route 99 on the south to the Tuolumne River on the north. The entire area is 2½ miles long and varies in width from ¼ mile to ½ mile. Figure 1-3 indicates the boundaries of the Mitchell Road corridor. The *Mitchell Road Corridor Specific Plan* states as its purpose and intent "to provide for the coordinated physical and economic development of the Mitchell Road Corridor." The *Mitchell Road Corridor Specific Plan* was adopted by ordinance and serves as zoning for the Mitchell Road Corridor area.

The corridor supports a range of land uses, including older strip commercial area and new and planned commercial centers located primarily between Fowler Street and Roeding Street and at the intersections of Hatch and Mitchell Roads and Don Pedro and Mitchell Roads.

The *Mitchell Road Corridor Specific Plan* includes seven land use zones, listed in Table 1-1, along with a summary of the principal allowable uses. For a complete set of all allowable, conditional, accessory, and prohibited uses, readers should refer to the *Specific Plan* itself. The seven zones established by the *Mitchell Road Corridor Specific Plan* are shown in Figure 1-3.

The *Specific Plan* also includes two sets of performance standards that apply in addition to the requirements of the eight subdistricts. Large lot performance standards apply to large lot areas within the corridor in order to provide design guidelines and development regulations to treat large lot areas as one, cohesive planning area. Internal circulation performance standards are applied to areas along Mitchell Road requiring the development of master plans to plan for frontages along Mitchell Road with internal circulation and parking, creating a development pattern with reduced impacts on Mitchell Road traffic. Policies in the *Specific Plan* limit the development and use of properties between Service Road and State Route 99 to short-term, temporary uses until such time as the design for a new Mitchell Road-State Route 99 interchange has been accepted by Caltrans.

TABLE 1-1 SUMMARY OF MITCHELL ROAD SPECIFIC PLAN LAND USE SUBDISTRICTS (ZONING)

Designation	Permitted Uses
Residential (R)	All residential uses, excluding hotel/motels, including low density, medium density, and high density residential uses, trailers, and mobile homes
Community Commercial (CC)	Retail sales; specialized sales; personal services; sit-down restaurants; banks/financial institutions; churches; day care facilities; parks and recreational facilities; public utilities and facilities
Highway Commercial (HC)	Auto sales and services; retail sales; restaurants; banks/financial institutions; business/administrative/ professional offices; churches; ambulance services; day care facilities; parks and recreational facilities; public utilities and facilities
Regional Commercial (RC)	Large-scale commercial uses; auto sales and services; warehouses; wholesale commercial uses; hotel/motels; personal services; retail sales; restaurants; banks/ financial institutions; churches; parks and recreational facilities; public utilities and facilities
Industrial Park (IP)	Auto/equipment repair; warehouses; wholesale commercial uses; music/radio/television studio; parks and recreational facilities; public utilities and facilities; industrial uses; technical and industrial training schools
Mixed Use 1 (MX1)	Auto/equipment repair; warehouses; wholesale commercial uses; retail sales; personal services; music/radio/television studio; restaurants; banks/financial institutions; churches; parks and recreational facilities; day care facilities; public utilities and facilities; limited industrial uses; technical and industrial training schools
Mixed Use 2 (MX2)	Sit-down restaurants; business/administrative/ professional offices; churches; parks and recreational facilities; day care facilities; public utilities and facilities; research and development; high density residential; technical and industrial training schools

Source: City of Ceres, *Mitchell Road Corridor Specific Plan*, 1989

The *Specific Plan* states the following seven goals:

1. Encourage an attractive variety of commercial uses within the Corridor to contribute economically, socially and visually to the community.
2. Provide opportunities and incentives for economically productive business enterprises and efficient use of land parcels, either through consolidation of existing parcels or coordinated planning of adjacent parcels.
3. Establish uses, local street design treatments, site development standards and design guidelines which contribute to the preservation and enhancement of adjacent residential environs.
4. Provide for the scale and nature of uses which can make the most efficient use of the existing development pattern as well as parcel size and shape.
5. Contribute to the improvements of both visual and functional attributes of the Corridor to help stimulate business activity.
6. Expand the traffic handling capacity of arterial highways, local streets and develop alternate circulatory routes to accommodate new development and redevelopment or rehabilitation of existing areas.
7. Establish a sense of place, as well as continuity and consistency of development standards within each district in the Corridor.

The *Specific Plan* establishes design guidelines by district, and guidelines for architecture, landscape, signs, and lighting.

1.6 REDEVELOPMENT

In the early 1990s, two redevelopment agencies were formed that substantially affect Ceres. The Ceres Redevelopment Agency was created in 1991. The Stanislaus-Ceres Redevelopment Commission (SCRC) was jointly-formed by the City and County in 1990. The boundaries of these areas are shown in Figure 1-4 and the agencies and their plans are discussed in detail in the following paragraphs.

1.6.1 CERES REDEVELOPMENT AGENCY

In 1991, the City created a redevelopment agency, established a redevelopment project, and prepared a redevelopment plan for the project. The Project covers approximately 1,484 acres of net subdivided land (i.e., excluding streets and rights-of-way). It includes approximately 3,200 housing units.

The project plan's EIR indicates that the Project Area exhibits the following conditions:

- 1) the growing lack of economically productive land utilization;
- 2) aging, obsolescent and deteriorating structures;
- 3) economic decline;
- 4) inadequate flood control/drainage infrastructure facilities;
- 5) inadequate pedestrian and vehicular circulation/roadway infrastructure and amenities; and
- 6) lack of visual design/character and/or cohesiveness.

The primary objective of the Project is to lessen and/or remove these negative conditions, which are generally referred to as "conditions of deficiency" or "blight."

As part of its primary objective, the Plan for the Project seeks to revitalize and upgrade the Project Area in accordance with the City's General Plan and all other applicable City, County, State, and Federal laws, restrictions, and guidelines, as well as to utilize existing underutilized and nonproductive undeveloped parcels. The Project Plan anticipates that this revitalization and upgrading will result in the following:

- Increased sales, property and business tax revenues,
- Provision of low to moderate income housing opportunities,
- Improvement of roadways and parking areas,
- Provision of a high level of City services,
- Strengthening of the existing employment base,
- Assurance of social and economic stability, and
- Promotion of aesthetic and environmental actions and improvements.

These actions are intended to make the Project Area and the whole City of Ceres a better place to live, work, shop, and enjoy leisure time.

The purposes of the California Community Redevelopment Law would be achieved within the Project Area through the provision of housing programs, the rehabilitation of obsolete or substandard structures, and other blighting influences; the installation, construction, reconstruction of streets, utilities, curbs, gutters, sidewalks, and other associated public improvements as permitted by the Ceres General Plan and Zoning Ordinance; the assemblage of land into parcels suitable for modern integrated development with improved pedestrian and vehicular circulation; and the general development and redevelopment of the Project Area in a manner consistent with the policies and goals of the Ceres General Plan.

The Agency proposes to eliminate and prevent the spread of deficient conditions within the Project Area by implementation of a series of proposed projects and programs (see Attachment D of the *Redevelopment Plan*).

1.6.2 STANISLAUS-CERES REDEVELOPMENT AREA

In 1990, the City and County jointly formed the Stanislaus-Ceres Redevelopment Commission (SCRC), which established a redevelopment project area consisting of two discontinuous subareas, one immediately north of Ceres' city limits and one immediately south, but both within Ceres' sphere of influence. Combined, these subareas cover approximately 470 net acres and contain approximately 1,200 dwelling units as of 1993. In adopting the Project Plan, the Commission was seeking to improve and restore the overall Project Area to the high standards of development found throughout newer areas of the County and City of Ceres. Following is a summary of the Commission's goals and objectives for the overall project generally and for the Project Plan specifically.

Overall Project Goals and Objectives

The *Redevelopment Plan* for the Project Area sets forth a number of general goals for the two non-contiguous areas of the Project. These include the following:

- The conservation, rehabilitation and community development of the Project Area, especially residential neighborhoods in accord with the General Plan, Community Plans, Specific Plans, the Redevelopment Plan and local codes and ordinances.
- The achievement of an environment reflecting a higher level of concern for architectural landscape, urban design and land use principles appropriate for attainment of the objectives of the Redevelopment Plan.
- The elimination or reduction of certain environmental deficiencies, including substandard vehicular circulation and parking systems; inadequate water, sewer and storm drainage systems; and other similar public and private improvements, facilities and utilities deficiencies adversely affecting the Project Area.
- The elimination and prevention of the spread of non-conforming uses which generally results in deterioration and blight among existing structures and land uses.
- The promotion and investment in rehabilitation and improvement programs for existing housing with the intent and purpose of enhancing the tenure and condition of the structures and properties.
- The promotion of new investment in housing opportunities for low and moderate income households in the unincorporated communities of Stanislaus County as suggested by the County's *Economic Strategic Plan* and required by the *Housing Element* of the General Plan.
- The control of unplanned growth by building revitalization, rehabilitation, and new development activities in such fashion as to meet the needs of the Project Area, balancing jobs and housing to reduce future urban congestion in central Stanislaus County, improving land utilization and the quality of life for county residents.
- The reduction of the County's annual costs of the provision of local services to and within the Project Area.
- The provision for increased sales taxes and revenues to Stanislaus County and ultimately to the City of Ceres after annexation.
- The promotion of new and continuing private sector investment within the Project Area to provide commercial activity for the needs of Project Area residents and to prevent the loss of and to facilitate the recapture of commercial sales activity.
- The retention and enhancement of as many existing businesses as possible by means of community development and rehabilitation activities and by encouraging and assisting the cooperation and participation of owners, businesses and public agencies in the revitalization of the Project Area.
- The creation and development of new local job opportunities and the preservation of the area's existing employment base by promoting, facilitating and preparing sites for new commercial service and industrial development with high employee concentrations and revenue generation potential.

Redevelopment Goals and Objectives

Redevelopment of the Project Area pursuant to the *Redevelopment Plan* and the above goals and objectives will attain the purposes of the California Community Redevelopment Law:

- By the elimination of areas suffering from economic dislocation as a result of faulty planning or other reasons;

- Through the installation of new or replacement of existing public improvements, facilities and utilities in areas which are currently inadequately served with regard to such improvements, facilities and utilities;
- By the replanning, redesign and rehabilitation and/or development of areas which are stagnant or improperly utilized, and which could not be accomplished by private enterprise acting alone without public participation and assistance; and
- By protecting and promoting sound development and redevelopment of blighted areas and the general welfare of the citizens of the county by remedying such conditions through the employment of appropriate means.

The *Redevelopment Plan* proposes to eliminate and prevent the spread of blight in the Project Area by:

- Installation, construction, or reconstruction of streets, utilities and other public improvements.
- Disposition of any property acquired for uses in accordance with the Plan.
- Development or redevelopment of land by private enterprise or public agencies for uses in accordance with the Plan.
- Rehabilitation, development or construction of low and moderate income housing within the County.
- Acquisition of certain real property under carefully controlled conditions and situations.
- Demolition or removal of certain improvements.
- Relocation assistance to displaced residential and non-residential occupants, if any.

1.7 ZONING

Under state law, cities and counties have broad latitude in establishing zoning standards and procedures. Outside of a general requirement for open space zoning and several special requirements governing residential zoning, state law establishes only broadly the scope of zoning regulation and sets minimum standards for its adoption and administration. One key requirement, however, is that zoning be consistent with the general plan.

Ceres' *Zoning Ordinance*, originally adopted in 1947, revised in 1968 and again in 1978, has been amended many times over the years. Ceres has fifteen different zones which regulate building density, intensity, and type of use. A basic description of these zones, as well as property development standards for each zone (Table 1-2) follows. These are only general standards and are provided for reference purposes only. The *Zoning Ordinance* itself should be consulted for specific questions regarding permitted, accessory, and conditional uses.

Zoning in the Mitchell Road corridor is governed by the *Mitchell Road Corridor Specific Plan*, as described in Section 1.5 of this chapter.

1.7.1 RESIDENTIAL ZONES

There are five residential zones in Ceres' zoning ordinance which are generally intended to provide for varying densities of residential development. The Residential Agriculture zone (R-A) allows one acre minimum parcels with both agricultural and residential uses allowed. R-1 and R-2 are Single Family Residential and Two-Family Residential zones, respectively. Both zones are intended to accommodate low-density residential development, and necessary services such as schools, parks and open space. R-2 can accommodate low- and medium-density development. R-3 and R-4 (Medium Density Multi-Family Residential and Medium-High Density Multi-Family Residential, respectively) provide for higher densities of housing, intermixed with lower densities and necessary services.

1.7.2 COMMERCIAL ZONES

Ceres has four commercial zones and an administrative professional zone. The Neighborhood Commercial (C-1) zone is intended to provide very limited commercial uses to serve neighborhood uses (e.g., convenience goods only). The Community Commercial zone allows a wider range of commercial

uses, as well as public, quasi-public, and administrative professional uses. Wholesale Commercial (C-3) is strictly a wholesale and commercial zone wherein residential uses are restricted. Finally, the Highway Commercial (H-1) zone provides for administrative professional, retail commercial, and service commercial uses which focus on meeting the needs of the travelling public. No residential uses are allowed in the H-1 zone. The Administrative Professional zone (A-P) allows concentrations of non-retail businesses and professional offices.

1.7.3 INDUSTRIAL ZONES

Ceres' industrial needs are accommodated through two industrial zones. M-1, Light Industrial, provides standards for light and specialized industrial uses and administrative research establishments. M-2, the General Industrial zone, is applied only to large areas where exclusive industrial development can occur without risk of conflict with surrounding land uses.

1.7.4 OTHER ZONES

In addition to the zones listed in Table 1-2, there is a planned community zone and two overlay zones. The purpose of the planned community (P-C) zone is to allow for variation of zoning standards in order to achieve a unique and innovative community design. The airport overlay (A-O) and historic preservation (H-P) overlay zones are intended to provide additional property development standards over the existing zoning regulations.

Table 1-3 summarizes the net acreage covered by the various zoning districts contained in the City's Zoning Ordinance. The table also shows the number of housing units within each of these districts.

TABLE 1-2 SUMMARY OF ZONING DEVELOPMENT STANDARDS

TABLE 1-2SUMMARY OF ZONING DEVELOPMENT STANDARDS											
Zoning	Min. Lot Area (sq. feet)	Minimum Lot Dimensions (feet)			Minimum Setback (feet)				Floor Area Ratio (FAR)		Maximum Building Height
		Interior	Corner	Cul-de-sac	Front	Rear	Side		1 story	2 stories	
							Interior	Exterior			Main
C-F	10,000	60x100	75x100	40x100	25	10	5	25	0.6:1	0.96:1	35' or 3 stories
R-A	1 acre	125x150	125x150	85x150	25	25	10	25	0.15:1	0.24:1	25' or 2 stories
R-1	6,200 int 7,500 ext	60x100	75x100	40x100	20	20% of lot depth	5	15	0.4:1	0.64:1	2 stories or 25'
R-2	6,000	60x100	75x100	40x100	20	20% of lot depth	5	10	0.5:1	0.45:1	2 stories or 25'
R-3	6,000	60x100	75x100	40x100	20	20% of lot depth	5	20	***	***	2.5 stories or 35'
R-4	5,400	60x100	75x100	40x100	20	20% of lot depth	5	20	***	***	3 stories or 35'
A-P	8,000	60x100	75x100	40x100	15	10	8	15	0.3:1	0.55:1	2 stories or 25'
C-1	10,000	60x100	75x100	40x100	10	10	5	10	0.5:1	0.8:1	2 stories or 25'
C-2	discret'ary	NP	NP	NP	5	10	NP	NP	NP	NP	discret'ary
C-3	NP	NP	NP	NP	5	NP	NP	NP	NP	NP	3 stories or 35'
H-1	10,000	100x100	100x100	70x100	10	10	10	10	0.6:1	0.96:1	3 stories or 35'
M-1	10,000	100x100	100x100	100x100	15	NP	NP	15	discretion	discretion	discretion
M-2	20,000	100x100	100x100	100x100	25	NP	NP	25	0.6:1	N/A	discretion

*** Varies by housing type

NP = No Provisions

Source: City of Ceres Zoning Ordinance

TABLE 1-3 CURRENT ZONING City of Ceres 1993

Category/Designation		Net Acreage	% of Total	Dwelling Units	% of Total
Residential					
Residential Agriculture	RA	17	0.6%	24	0.2%

Single-Family	R-1	1,236	41.3%	5,449	55.3%
Two-Family	R-2	16	0.5%	130	1.3%
Medium Density Multiple Family	R-3	133	4.4%	837	8.5%
Medium High Density Multiple Family	R-4	58	1.9%	433	4.4%
MRCSP Residential	MRCSP: R	34	1.1%	309	3.1%
Residential Subtotal		1,494	49.9%	7,182	72.9%
Commercial					
Neighborhood	C-1	10	0.3%	23	0.2%
Community	C-2	100	3.3%	147	1.5%
Wholesale	C-3	15	0.5%	64	0.7%
Highway	H-1	7	0.2%	15	0.2%
Administrative Professional	A-P	23	0.8%	59	0.6%
MRCSP Neighborhood	MRCSP: NC	45	1.5%	0	0.0%
MRCSP Highway	MRCSP: HC	30	1.0%	7	0.1%
MRCSP Freeway	MRCSP: FC	52	1.7%	64	0.7%
MRCSP Quasi-Regional	MRCSP: QRC	62	2.1%	8	0.1%
Commercial Subtotal		343	11.5%	387	3.9%
Industrial					
Light	M-1	59	2.0%	36	0.4%
Heavy	M-2	170	5.7%	6	0.1%
MRCSP Industrial Park	MRCSP: IP	11	0.3%	0	0.0%
Industrial Subtotal		239	8.0%	42	0.4%
Miscellaneous					
Community Facilities	C-F	365	12.2%	9	0.1%
Agriculture	A	6	0.2%	2	0.0%
Planned Community	PC	287	9.6%	2,164	22.0%
MRCSP: Mixed Use 1	MRCSP: MX-1	56	1.9%	49	0.5%
MRCSP: Mixed Use 2	MRCSP: MX-2	93	3.1%	11	0.1%
Mixed Designations	Mixed	112	3.7%	0	0.0%
Miscellaneous Subtotal		919	30.7%	2,235	22.7%
TOTAL		2,995	100.0%	9,846	100.0%
MRCSP = Mitchell Road Corridor Specific Plan Source: City of Ceres Land Use Database, February 1993					

1.8 EXISTING LAND USE

The City compiled a parcel-based land use inventory for the entire General Plan Study Area, with a baseline data based on February 1993. The inventory is derived primarily from County Assessor's records, but has been supplemented by City staff based on limited field research and information from Ceres, Modesto, and Stanislaus County. The City's consultants have used this information to tabulate data on existing land uses within the Study Area, including disaggregated information for those parts of the Study Area within Ceres, Modesto, and unincorporated Stanislaus County. For each of these areas, the consultants summarized the net acreage and number of dwelling units for five major categories (residential, commercial, industrial, agricultural, and institutional), as well as for vacant land. For each of the five major categories, the information has also been reported in more specific subcategories. It should be noted that the net acreage totals reflect the amount of parcelized (i.e., subdivided) land; it does not include street and roadway rights-of-way or canals.

Table 1-4 shows the results of the generalized results of the consultants' tabulations disaggregated by area and major land use category. As the table indicates, the General Plan Study Area covers a total area of approximately 13,770 net acres, of which 21.8 percent is within Ceres' city limits, 5.2 percent is in Modesto, and 73.1 percent is unincorporated. According to the inventory, the Study Area contained

approximately 16,350 dwelling units, 60.2 percent of which were within Ceres' city limits, while 8.5 percent and 31.3 percent were in Modesto and the unincorporated area, respectively.

Tables 1-5 through 1-8 provide a detailed breakdown of land use types for the entire General Plan Study Area and for those areas within Ceres' city limits, Modesto's city limits, and unincorporated Stanislaus County. As these tables show, over half of the land within Ceres' city limits is devoted to residential uses, almost 10 percent to commercial uses, 4 percent to industrial uses, 17 percent to institutional uses, and 18 percent is vacant. The part of the Study Area within the Modesto city limits is about 30 percent industrial, 28 percent residential, 13 percent institutional, and 27 percent vacant land (not in agricultural production). The unincorporated part of the Study Area is predominately agricultural, with 73 percent devoted to agricultural uses. Another 15 percent of the land is residential, 4 percent industrial, less than 2 percent commercial and institutional, and 6 percent is vacant.

TABLE 1-4 GENERALIZED EXISTING LAND USE City of Ceres General Plan Study Area 1993

Category	City of Ceres				City of Modesto				Unincorporated Stanislaus County				Total General Plan Study Area			
	Net Acreage	% of Total	Units	% of Total	Net Acreage	% of Total	Units	% of Total	Net Acreage	% of Total	Units	% of Total	Net Acreage	% of Total	Units	% of Total
Residential	1,531	51.0%	9,419	95.7%	199	27.9%	1,377	99.4%	1,458	14.5%	4,510	88.2%	3,188	23.2%	15,306	93.6%
Commercial	277	9.3%	128	1.3%	16	2.2%	3	0.2%	168	1.7%	100	2.0%	461	3.3%	231	1.4%
Industrial	132	4.4%	5	0.1%	209	29.4%	2	0.1%	428	4.3%	26	0.5%	769	5.6%	33	0.2%
Agriculture	8	0.3%	3	0.0%	5	0.7%	1	0.1%	7,278	72.4%	444	8.7%	7,291	53.0%	448	2.7%
Institutional	507	16.9%	123	1.2%	92	12.9%			124	1.2%	12	0.2%	723	5.3%	135	0.8%
Vacant	544	18.1%	169	1.7%	191	26.9%	2	0.1%	603	6.0%	24	0.5%	1,338	9.7%	195	1.2%
TOTAL	2,999	100.0%	9,847	100.0%	712	100.0%	1,385	100.0%	10,058	100.0%	5,116	100.0%	13,769	100.0%	16,348	100.0%

TABLE 1-5 EXISTING LAND USE City of Ceres 1993

Category	Net Acreage	% of Total	Units	% of Total
RESIDENTIAL				
Single Family	1,289	43.0%	6,578	66.8%
Multi-Family: 2-3 units	39	1.3%	379	3.8%
Multi-Family: 4-9 units	23	0.8%	274	2.8%
Multi-Family: 10-29 units	14	0.5%	226	2.3%
Multi-Family: 30 or more units	73	2.4%	1,180	12.0%
Condominium	8	0.3%	54	0.5%
Mobilehomes	85	2.8%	728	7.4%
Residential Subtotal	1,531	51.0%	9,419	95.7%
COMMERCIAL				
General Commercial	95	3.2%	2	0.0%
Restaurant/Fast Food	10	0.3%	1	0.0%
Office	17	0.6%	--	--
Hotels/Motels	4	0.1%	50	0.5%
Private Recreation	75	2.5%	1	0.0%
Miscellaneous/Transitional Commercial	76	2.5%	74	0.8%
Commercial Subtotal	277	9.3%	128	1.3%
INDUSTRIAL				
Farm/Heavy Equipment Sales	--	--	--	--
Warehouse	87	2.9%	--	--
Manufacturing	34	1.1%	1	0.0%
Miscellaneous Industrial	11	0.4%	4	0.0%
Industrial Subtotal	132	4.4%	5	0.1%
AGRICULTURAL				
Agricultural Production (Non-Dairy)	8	0.3%	3	0.0%
Dairy	--	--	--	--
Agricultural Subtotal	8	0.3%	3	0.0%
INSTITUTIONAL				
Private Institutional	104	3.5%	116	1.2%
Public Institutional	403	13.5%	7	0.1%
Institutional Subtotal	507	16.9%	123	1.2%
VACANT				
Vacant Land	544	18.1%	169	1.7%
TOTAL	2,999	100.0%	9,847.00	100.0%

Source: City of Ceres Land Use Database, February 1993

TABLE 1-6 EXISTING LAND USE General Plan Study Area within City of Modesto 1993

Category	Net Acreage	% of Total	Units	% of Total
RESIDENTIAL				
Single Family	189	26.5%	1,355	97.8%
Multi-Family: 2-3 units	2	0.3%	22	1.6%
Multi-Family: 4-9 units	--	--	--	--
Multi-Family: 10-29 units	--	--	--	--
Multi-Family: 30 or more units	8	1.1%	--	--
Condominium	--	--	--	--

Mobilehomes	--	--	--	--
Residential Subtotal	199	27.9%	1,377	99.4%
COMMERCIAL				
General Commercial	12	1.7%	2	0.1%
Restaurant/Fast Food	--	--	--	--
Office	--	--	--	--
Hotels/Motels	--	--	--	--
Private Recreation	--	--	--	--
Miscellaneous/Transitional Commercial	3	0.5%	1	0.1%
Commercial Subtotal	15	2.2%	3	0.2%
INDUSTRIAL				
Farm/Heavy Equipment Sales	18	2.5%	--	--
Warehouse	39	5.4%	1	0.1%
Manufacturing	151	21.2%	--	--
Miscellaneous Industrial	1	0.2%	1	0.1%
Industrial Subtotal	209	29.4%	2	0.1%
AGRICULTURAL				
Agricultural Production (Non-Dairy)	5	0.7%	1	0.1%
Dairy	--	--	--	--
Agricultural Subtotal	5	0.7%	1	0.1%
INSTITUTIONAL				
Private Institutional	3	0.4%	--	--
Public Institutional	89	12.5%	--	--
Institutional Subtotal	92	12.9%		
VACANT				
Vacant Land	191	26.9%	2	0.1%
TOTAL	712	100.0%	1,385	100.0%
Source: City of Ceres Land Use Database, February 1993				

TABLE 1-7 EXISTING LAND USE General Plan Study Area in Unincorporated Stanislaus County 1993

Category	Net Acreage	% of Total	Units	% of Total
RESIDENTIAL				
Single Family	1,283	12.8%	3,520	68.8%
Multi-Family: 2-3 units	47	0.5%	371	7.3%
Multi-Family: 4-9 units	14	0.1%	57	1.1%
Multi-Family: 10-29 units	2	0.0%	34	0.7%
Multi-Family: 30 or more units	9	0.1%	46	0.9%
Condominium	--	--	2	0.0%
Mobilehomes	103	1.0%	480	9.4%
Residential Subtotal	1,458	14.5%	4,510	88.2%
COMMERCIAL				
General Commercial	53	0.5%	16	0.3%
Restaurant/Fast Food	5	0.0%	1	0.0%
Office	1	0.0%	--	--

Hotels/Motels	9	0.1%	34	0.7%
Private Recreation	--	--	--	--
Miscellaneous/Transitional Commercial	100	1.0%	49	1.0%
Commercial Subtotal	168	1.7%	100	2.0%
INDUSTRIAL				
Farm/Heavy Equipment Sales	69	0.7%	1	0.0%
Warehouse	69	0.7%	2	0.0%
Manufacturing	217	2.2%	3	0.1%
Miscellaneous Industrial	74	0.7%	20	0.4%
Industrial Subtotal	428	4.3%	26	0.5%
AGRICULTURAL				
Agricultural Production (Non-Dairy)	6,963	69.2%	435	8.5%
Dairy	315	3.1%	9	0.2%
Agricultural Subtotal	7,278	72.4%	444	8.7%
INSTITUTIONAL				
Private Institutional	38	0.4%	8	0.2%
Public Institutional	86	0.9%	4	0.1%
Institutional Subtotal	124	1.2%	12	0.2%
VACANT				
Vacant Land	603	6.0%	24	0.5%
TOTAL	10,058	100.0%	5,116	100.0%

Source: City of Ceres Land Use Database, February 1993

TABLE 1-8EXISTING LAND USETotal General Plan Study Area1993

Category/Use	Net Acreage	% of Total	Units	% of Total
Residential				
Single Family	2,761	20.1%	11,453	70.1%
Multi-Family: 2-3 units	88	0.6%	772	4.7%
Multi-Family: 4-9 units	37	0.3%	331	2.0%
Multi-Family: 10-29 units	16	0.1%	260	1.6%
Multi-Family: 30 or more units	90	0.7%	1,226	7.5%
Condominium	8	0.1%	56	0.3%
Mobilehomes	188	1.4%	1,208	7.4%
Residential Subtotal	3,188	23.2%	15,306	93.6%
Commercial				
General Commercial	160	1.2%	20	0.1%
Restaurant/Fast Food	15	0.1%	2	0%
Office	18	0.1%	0	0%
Hotels/Motels	13	0.1%	84	0.5%
Private Recreation	75	0.5%	1	0%
Miscellaneous/Transitional Commercial	179	1.3%	124	0.8%
Commercial Subtotal	460	3.3%	231	1.4%
Industrial				
Farm/Heavy Equip. Sales	87	0.6%	1	0%
Warehouse	195	1.4%	3	0%
Manufacturing	402	2.9%	4	0%
Miscellaneous Industrial	86	0.6%	25	0.2%
Industrial Subtotal	770	5.6%	33	0.2%
Agricultural				
Agricultural Production (Non-Dairy)	6,976	50.7%	439	2.7%
Agriculture (Dairy)	315	2.3%	0	0%
Agricultural Subtotal	7,291	52.9%	448	2.7%
Institutional				

Private Institutional	145	1.1%	124	0.8%
Public Institutional	578	4.2%	11	0.1%
Institutional Subtotal	723	5.3%	135	0.8%
Vacant				
Vacant Land (Non-agricultural)	1,338	9.7%	195	1.2%
TOTAL	13,770	100.0%	16,348.00	100.0%

Source: City of Ceres Land Use Database, February 1993

1.9 LOCAL AGENCY FORMATION COMMISSION, SPHERE OF INFLUENCE, AND ANNEXATION

In 1985, the various state laws regulating city and special district organization and annexations were consolidated in the Cortese-Knox Local Government Reorganization Act (*Government Code §56000 et seq.*).

1.9.1 LOCAL AGENCY FORMATION COMMISSION

The 1963 Knox-Nisbet Act, which was superseded by Cortese-Knox, created local agency formation commissions (LAFCOs) in each county in California to regulate the organization and extension of services provided by cities and special districts. The Act declares that "among the purposes of the commission are the discouragement of urban sprawl and encouragement of the orderly formation and development of local agencies based upon local conditions and circumstances. One of the objectives of the commission is to make studies and to obtain and furnish information which will contribute to the logical and reasonable development of local agencies in each county and to shape the development of local agencies so as to advantageously provide for the present and future needs of each county and its communities" (*Government Code §56301*). In meeting these responsibilities, each LAFCO is required "to review and approve or disapprove, with or without amendment, wholly, partially, or conditionally, proposals for changes of organization or reorganization" (*Government Code §56375 (a)*).

According to Section 56021 of the *Government Code*, "change of organization" means any of the following:

- A city incorporation
- A district formation
- An annexation to, or detachment from, a city or district
- A disincorporation of a city
- A district dissolution
- A consolidation of cities or special districts
- A merger or establishment of a subsidiary district

The special districts that fall under LAFCO jurisdiction are defined in *Government Code* Section 56036. School districts and redevelopment agencies, among others, are excluded within this definition and are, therefore, not subject to LAFCO review.

In addition to the regulatory responsibilities of LAFCO, the commission is empowered to initiate and to make studies of existing governmental agencies. These studies include, but are not limited to, inventorying local agencies and determining their maximum service areas and service capabilities.

LAFCOs may also adopt their own rules and procedures. The following LAFCO policies for review of proposals included in LAFCO's *Policies and Procedures Manual*, August 1991 (revised March 1993) may be important to Ceres in terms of future annexations and modifications to the City's sphere of influence.

101. Encouraging orderly formation and development of agencies:

- 01 The sphere of influence determined by the Commission shall take into account the provision of an adequate level and range of services to each community within the county. . . .
- 02 Any proposal for a change of organization or reorganization shall contain sufficient information to determine that adequate services, facilities, and improvements can be provided and financed by the agencies responsible for the provision of such services, facilities, and improvements. Any public entity affected by a proposed change of organization or proposed reorganization may submit a fiscal impact statement to the commission prior to the public hearing on the matter.

103 Encouraging orderly urban development and preservation of open space patterns:

- 01 The Commission encourages well planned, orderly, and compact urban development patterns for all developing areas. Also, the county, cities, and those districts providing urban services, are encouraged to develop and implement plans and policies which will provide for well-planned, orderly and compact urban development patterns, with consideration of preserving permanent open space lands within those urban patterns.
- 02 Development of existing vacant non-open space, and non-prime agricultural land within an agency's boundaries is encouraged prior to further annexation and development.

104 Encouraging conservation of prime agricultural lands and open space areas:

- 01 Proposals which would conflict with the goals of maintaining the physical and economic integrity of open space lands, agricultural lands, or agricultural preserve areas in open space uses, as indicated on the city or county general plan, shall be discouraged.
- 02 Annexation and development of existing vacant non-open space lands, and non-prime agricultural land within an agency's sphere of influence should occur prior to development outside of an existing sphere of influence.
- 03 Loss of agricultural lands should not be a primary issue for annexation where city and county general plans indicate urban development is appropriate and there is consistency with the agency's sphere of influence.

1.9.2 SPHERE OF INFLUENCE

As the basis in part for making decisions about organizational changes and annexations, LAFCO must adopt a sphere of influence for each local agency subject to LAFCO regulation. The Cortese-Knox Act defines a sphere of influence as "a plan for the probable ultimate physical boundaries and service area of a local agency" (*Government Code* §56076). In practice, "ultimate" is typically defined as 20 years. Under *Government Code* Section 56080, this can include the identification of an "urban service area" which identifies an area within a city's sphere of influence which served by urban facilities, utilities, and services, or which is proposed to be served during the first five years of an adopted capital improvement plan. The urban service area boundary shall be adopted by the LAFCO in cooperation with the affected city (*Government Code* §56080). Annexations by the affected city of land which falls within an identified "urban service area boundary" may not be denied by the LAFCO which adopts the boundaries under certain circumstances.

In determining the sphere of influence for each local agency, the LAFCO must consider and prepare a written statement of its determinations with respect to each of the following:

- The present and planned land uses in the area, including agricultural and open space lands.
- The present and probable need for public facilities and services in the area.
- The present capacity of public facilities and the adequacy of public services which the agency provides or is authorized to provide.
- The existence of any social or economic communities of interest in the area if the commission determines that they are relevant to the agency (*Government Code* §56425).

Once these spheres are adopted, LAFCO decisions must be consistent with applicable spheres (*Government Code* §5637.5). This means that LAFCO may not approve city annexations outside the adopted sphere of influence for a city.

As a matter of policy, the Stanislaus County LAFCO determines a primary (10-year) and secondary (20-year) sphere of influence for each city. Ceres' primary sphere of influence is its intermediate urban service boundary and its secondary sphere of influence is its ultimate urban service boundary, as shown in Figure 1-5. Ceres' current sphere of influence (as of June 1994) was formally adopted by the Stanislaus County LAFCO in December 1984.

1.9.3 ANNEXATION HISTORY

Annexations to cities are also regulated by the Cortese-Knox Act. Generally, any land that is contiguous to a city and within its sphere of influence may be annexed to the city if the annexation does not result in an island of unincorporated land or in narrow strips of unincorporated land.

Proponents of an annexation must secure the approval of LAFCO. Annexations proceedings may be initiated by application to LAFCO either by resolution of the City or through petition of landowners or registered voters, after securing City approval of rezoning for the area. LAFCO holds a hearing on the proposed annexation, considers the proposal, staff report, testimony of affected agencies and parties, service plan, and environmental documents, and approves or disapproves the annexation proposal. Upon LAFCO approval, unless the City has been authorized to proceed without notice and hearing, the City must conduct a protest hearing. At the protest hearing, the City Council must either approve the proposal, terminate the proposal, or call for election, based on the proportion of written protests of the registered voters or landowners received.

In inhabited territory (territory with at least 12 registered voters), the City Council must order the change if written protests have been filed by less than 25 percent of the registered voters or less than 25 percent of the number of owners of land who also own 25 percent of assessed value of land with the affected territory. The proposal must be terminated by the City Council if written protests have been filed by more than 50 percent of the voters in the affected territory. The City Council must send the proposal to special election if written protest is filed by 25 to 50 percent of voters or landowners of inhabited territory (*Government Code §57075 (a)*). If approved by the voters, the City must adopt a resolution of approval and forward the resolution to LAFCO.

In uninhabited territory, the City must approve the proposal if no protest of landowners owning 50 percent or more of the assessed value of land within the territory is received and deny it if a majority protest is filed (*Government Code §57075 (b)*). Annexation proposals disapproved by LAFCO, terminated by written protest, or terminated by special election generally must wait at least one year before a similar proposal is resubmitted to LAFCO. In some cases, however, LAFCO will deny the annexation without prejudice, allowing resubmission within a year.

Since the 1940s when annexations began being recorded, the city of Ceres has grown through annexation by over 3,400 gross acres. Most of the annexations were relatively small, less than 25 acres. The largest annexations in size occurred in 1971, with an annexation of 281 acres, in 1980 with the 200-acre Industrial Park annexation, and in 1991, with the 252-acre West Ceres annexation. Table 1-9 lists annexations depicted in Figure 1-6. As shown in Table 1-9, the most land was annexed during the 1970s, with 1,239 acres, with a similar number during the 1980s at 1,196 acres.

TABLE 1-9 ANNEXATION HISTORY

No.	Annexation Name	Date	Acreage
1	Untitled	11/13/47	20.0
2	Portion of Caswell Tract	12/27/48	18.0
3	Portion of Caswell Tract	11/28/52	9.8
4	Portion of Morrow Village	7/9/53	25.0
5	Untitled	2/10/54	0.3
6	Morrow Village #2	11/10/54	15.1
7	North Central Tract	3/21/55	3.8
8	Morrow Village #4	7/5/55	20.2
9	Sequoia Village	9/22/55	9.9
10	Block 12, Caswell Tract	9/22/55	0.1
11	Morrow Village # 5	3/2/56	19.9
12	Portion Lot B, Smyrna Park	12/21/56	2.5
13	Wastewater Treatment Plant # 1	3/10/59	19.7
14	Mitchell Road Baptist Church	2/17/59	1.0
15	Ed Whitmore Addition	4/13/59	13.4
16	Wastewater Treatment Plant # 2	9/22/59	13.3
17	Gier Addition	12/3/59	6.5
18	Bucknam Addition	12/3/59	21.2
Subtotal 1947 to 1959			209.7
19	J.j. Caswell Addition	3/2/60	22.4
20	Charles N. Whitmore Addition	5/16/60	14.6
21	Free Will Baptist Church	8/12/60	1.6
22	Lewis-berg Addition	8/12/60	5.2
23	Souza Addition	8/12/60	7.2
24	Fowler Moffet	7/14/61	18.0
25	Farm Labor Addition	8/31/61	27.4
26	Cemetery Addition	12/15/61	8.1
27	Valley Gardens Subdivision	12/28/61	66.2

TABLE 1-9ANNEXATION HISTORY

28	Williams Addition	4/4/62	0.8
29	Charles N, Whitmore # 2	5/25/62	11.7
30	Charles N, Whitmore # 3	8/31/62	17.7
31	Wastewater Treatment Plant # 3	4/30/64	31.7
32	Grosso Addition	9/15/65	2.1
33	Wood Acres Addition	2/12/65	19.0
34	North 5th Street	10/31/66	2.9
35	North 5th Street # 7	10/31/66	3.5
36	Northview Aloha Addition	8/14/67	34.5
37	Northview Aloha Addition	2/26/68	34.5
38	Mason Addition	2/26/68	1.1
39	Adkins Addition	2/26/68	0.3
40	Modesto Union Academy	6/24/68	20.1
41	Ramos-Soderlund-Whitmore	10/21/68	16.1
42	Harvey-Soderlund-Whitmore	10/21/68	60.8
Subtotal, 1960s			427.4
43	Howard Training Center	6/24/70	10.0
44	North Fifth Street # 2	7/10/70	10.0
45	Whitmore #6	8/14/70	10.0
46	Pound Property	9/15/70	4.7
47	Moni	10/22/70	2.1
48	Winchester	10/22/70	11.4
49	Malik	10/22/70	20.6
50	Marrow Tract	6/17/71	20.3
51	Fair Tract	4/22/71	281.1
52	Whitmore	1/28/71	28.5
53	Fowler Park	6/17/71	30.1
54	Cook-ellingson	9/28/71	25.1
55	Hudson	11/8/71	5.6
56	Welsh	11/29/71	1.0
57	Abernathy	12/14/71	15.6
58	Cook-Ellingston-Bryant	4/15/72	34.1
59	Paris-Rogers	6/30/72	5.0
60	Cox-Busick	7/31/72	23.1
61	Durosette-Hensley	8/21/72	35.5
62	Allen	10/13/72	23.6
63	Wix	10/13/72	20.0
64	Barbour	10/13/72	29.4
65	Artinyan	11/11/72	10.1
66	Jones-Steinpress	2/27/73	1.5
67	Don Pedro- Mitchell	3/27/73	47.7
68	Farris-Steinpress-Foster	3/27/73	20.1
69	Moffet-Busick-Cox	4/27/73	20.7
70	Paul	5/25/73	2.3
71	Bradford	10/21/73	52.5
72	Warner	6/6/75	10.0

TABLE 1-9ANNEXATION HISTORY

73	Tamkin	6/30/75	7.2
74	Grosso	10/29/75	5.0
75	Peachwood Estates	7/19/76	47.9
76	Redwood Estates	8/10/76	13.3
77	Larosa Estates	8/31/76	41.9
78	Calcagno	12/15/76	71.2
79	Corfman	6/27/77	4.7
80	Nineveh	8/26/77	19.7
81	Grover	2/10/78	39.4
82	Fowler	2/13/78	13.1
83	Edith Pond	2/13/78	3.9
84	Phipps Golf Course	6/7/78	72.4
85	Caswell Island	8/8/78	6.0
86	Castle-Blocker-Shull	10/30/78	22.2
87	Fisher	10/30/78	5.0
88	Helding	10/30/78	9.4
89	Palmer	12/26/78	3.7
90	Ledbetter	5/6/79	5.7
91	Nelson	5/16/79	19.9
93	Dami	7/18/79	15.8
Subtotal, 1970s			1,239.1
92	Hagerty	5/23/80	14.3
94	Cronan	5/23/80	7.2
95	Old Vineyard Estates	5/30/80	19.4
96	Industrial Park	6/27/80	200.0
97	Mcknight	7/3/80	40.2
98	Commigs-Michael	7/3/80	2.1
99	Bradley	7/23/80	21.7
100	Cornish	7/23/80	13.8
101	Price	10/15/80	23.2
102	Lander	11/18/80	10.0
103	Bollakis	12/19/80	28.0
104	Kraus-Noonan	12/19/80	50.5
105	Patterson	3/3/81	5.1
106	Bianny	11/10/81	10.3
107	Wastewater Treatment Plant #4	3/18/82	85.0
108	Bright	3/22/82	7.5
109	Thomas	3/22/82	2.9
110	Tompson	7/6/82	1.1
111	Don Pedro Park	10/7/83	9.9
112	Wastewater Treatment Plant #5	10/7/83	41.2
113	Latourette	11/27/85	21.8
114	Lavelle & Hoover	8/28/86	41.7
115	Graham	9/25/86	84.4
116	Hednley	10/30/86	51.9
117	Pink	11/7/86	10.4

TABLE 1-9 ANNEXATION HISTORY

118	Hacket/ Blaker	11/10/86	24.5
119	Don Pedro	1/22/87	148.3
120	Johnson	1/30/87	11.7
121	Mccoone	4/28/87	60.0
122	Kinser	4/12/88	51.2
123	Nadine/ Herndon	6/9/88	15.2
124	Spring Meadows	8/17/88	61.6
125	Zimmerman	2/21/89	8.9
126	Sands	6/8/89	11.6
Subtotal, 1980s			1,196.5
127	North Central	2/27/91	37.2
128	Mitchell Road	2/27/91	17.0
129	West Ceres	6/10/91	252.7
130	Central Hatch	9/14/92	30.4
131	Stonum	2/10/92	14.6
132	Houston	5/10/93	27.8
133	Vaughn	4/10/95	19.0
134	Brown	5/13/96	150.0
135	Service Road Industrial	5/13/96	371.0
Subtotal, 1990s			919.7
GRAND TOTAL SINCE 1947			3,992.4
Source: City of Ceres, 1994			

1.10 OTHER PLANS AND LAND USE REGULATIONS AFFECTING CERES

1.10.1 STANISLAUS COUNTY GENERAL PLAN

The *Stanislaus County General Plan* and *Zoning Ordinance* regulate land use in the unincorporated Ceres Study Area. The *Stanislaus County Plan* was adopted in June 1987.

The Stanislaus County General Plan designates unincorporated land within the sphere of influence as Urban Transition. Other unincorporated areas within the Study Area are designated Commercial, Low Density Residential, Medium Density Residential, Industrial, and Agricultural. Summaries of these land use designations are described below and acreage within each zoning category within the Study Area are shown in Table 1-10.

The **Urban Transition** designation is intended to ensure that land remains in agricultural usage until urban development consistent with a city's general plan designation is approved. Generally, urban development will only occur upon annexation to a city. Development may be permitted prior to annexation provided the development is consistent with the land use designation of the general plan of the affected city.

Until Urban Transition lands within a sphere of influence are annexed, they are typically zoned General Agriculture (A-2). Planned Development (PD) zoning may also be used provided the development does not exceed the established building intensity standards. Building intensity and population density standards are the same as under the Agricultural designation.

Goal five of the *Stanislaus County General Plan* is to "complement the general plans of cities within the county." To this end, the *General Plan* contains the several policies concerning development within the unincorporated portion of a city's sphere of influence. These policies do not allow development to occur in the city's sphere of influence if it is inconsistent with a city's adopted general plan. Development projects proposed for such areas, which require discretionary approval, are referred to the appropriate

city to determine whether the project meets its development standards, and whether the project shall be approved. In addition to meeting the affected city's development standards, the project must also conform to any fee collection requirements for public facilities. Exceptions include agricultural and related uses and churches.

The **Low Density Residential** designation allows for single family detached homes. Lands designated Low Density Residential are zoned Rural Residential (R-A) and Single Family Residential (R-1). Planned Development (PD) zoning may also be used provided the development does not exceed the established building intensity standards. Population density ranges from 0 to 25 persons per net acre in areas served by public water and sewer, and 0 to 6 persons per net acres in other areas. Low Density Residential areas are located throughout the Study Area, including unincorporated islands within the boundaries of Ceres' city limits, and in the northern part of the Study Area between Herndon Road and State Route 99.

The **Medium Density Residential** designation allows for single and multi-family units, including single family detached homes, manufactured houses, duplexes, triplexes, and small multi-family complexes (e.g., townhouses and garden apartments). Land designated Medium Density Residential are zoned Duplex Residential (R-2). Planned Development (PD) zoning is also encouraged in some circumstances. Residential building density ranges from 0 to 14 units per net acre. New development with Medium Density Residential can be developed only after annexation to and service by a sanitary district or community services district. Limited areas of Medium Density Residential are located in unincorporated residential areas.

The **Commercial** designation allows for light and heavy commercial uses, including retail, service, and wholesale operations. Land designated Commercial in the Study Area is zoned Neighborhood Commercial (C-1), General Commercial (C-2), and Highway Frontage Commercial (H-1). Commercial designated land is located in the northern and southern parts of the Study Area along State Route 99 (from Hatch Road to the river on the north and at Service Road on the south), and east of Mitchell Road and south of Whitmore.

The **Industrial** designation allows for light and heavy industrial uses, including manufacturing and warehousing. Land within the Industrial designation within the Study Area is zoned Industrial (M) and is located on the east side of Crows Landing Road, north and south of Whitmore Avenue and in the northern part of the Study Area immediately south of the Tuolumne River west of South 9th Street.

The **Agricultural** designation covers most of the non-urbanized Study Area. This designation allows for agricultural operations as its primary use, and also allows for dwelling units, limited agricultural commercial and industrial uses, open space, and ranchettes.

Agricultural zoning within the Agricultural designation in the Study Area includes the Exclusive Agriculture (A-2) zones, with three subdistricts of this zone limiting lot sizes to 40, 10, and 3 acres minimums, as indicated by their suffixes (A-2-40, A-2-10, and A-2-3).

Table 1-10 lists the acreage within each zoning category in the unincorporated part of the Study Area, based on the land use database compiled by the City. Table 1-10 lists pre-zoned lands with the City's zoning first and the County zoning in parentheses. These areas are unincorporated lands within Ceres' sphere of influence.

1.10.2 STANISLAUS COUNTY AGRICULTURAL ELEMENT

Stanislaus County adopted an *Agricultural Element* to its General Plan in April 1992. As a primary objective, the *Agricultural Element* contains the following goal: "Preserve Our Agricultural Lands for Agricultural Uses." To achieve this goal, the *Agricultural Element* contains several policies and programs for the County's continued participation in the Williamson Act program. The *Agricultural Element* also includes the following policies concerning "Urbanization and the Conversion of Agricultural Land."

- 2.3 To reduce development pressures on agricultural lands, higher density development and in-filling shall be encouraged in urban and built-up areas of the County.
- 2.4 To the greatest extent possible, development shall be directed away from the County's most productive agricultural areas.
- 2.5 New areas for urban development (as opposed to expansion of existing areas) shall be limited to less productive agricultural areas.

- 2.6 Agricultural lands restricted to agricultural use shall not be assessed to pay for infrastructure needed to accommodate new development.
- 2.7 Proposed amendments to the General Plan Diagram (map) that would allow the conversion of agricultural land to non-agricultural uses shall be approved only if they are consistent with the County's conversion criteria.

Other relevant policies include those for "Expansion of Cities and Unincorporated Communities."

- 2.8 The County recognizes the right of cities and unincorporated communities to grow and prosper and shall not oppose reasonable requests to expand spheres of influence of cities or community services districts and sanitary districts serving unincorporated communities in managing development in urban transition areas.
- 2.10 The County shall continue to encourage the upgrading of existing unincorporated communities.
- 2.11 The County shall discourage the expansion of spheres of influence of cities or community services districts and sanitary districts serving unincorporated communities into its most productive agricultural areas.

TABLE 1-10 CURRENT ZONING Stanislaus County Zoning Districts within the General Plan Study Area 1993

Agricultural	Net Acreage	% of Total	Units	% of Total
A-2-40	5,530	55.0%	311	6.1%
A-2-10	2,835	28.2%	639	12.5%
A-2-3	7	0.1%	6	0.1%
Subtotal	8,372	83.2%	956	18.7%
Residential				
R-A	62	0.6%	148	2.9%
R-R	10	0.1%	1	0.0%
R-1	504	5.0%	2,389	46.7%
R-2	11	0.1%	71	1.4%
R-3	163	1.6%	972	19.0%
Subtotal	750	7.5%	3,581	70.0%
Commercial				
C-1	9	0.1%	33	0.6%
C-2	137	1.4%	118	2.3%
H-1	7	0.1%	31	0.6%
Subtotal	153	1.5%	182	3.6%
Industrial				
M	264	2.6%	36	0.7%
Subtotal	264	2.6%	36	0.7%
Planned Developments				
PD-24	6	0.1%	1	0.0%
PD-83	3	0.0%	0	0.0%
PD-127	35	0.3%	19	0.4%
Subtotal	45	0.4%	20	0.4%
Prezoned Land				
(P) R-1 [A-2-3]	105	1.0%	65	1.3%
(P) R-1 [R-A]	131	1.3%	247	4.8%
(P) P-C [R-3]	4	0.0%	9	0.2%
(P) MX-2 [A-2-10]	14	0.1%	6	0.1%
(P) MX-2 [A-2-3]	28	0.3%	6	0.1%
(P) M-1 [A-2-10]	15	0.2%	1	0.0%
(P) M-2 [M]	125	1.2%	1	0.0%

(P) C-F [A-2-10]	47	0.5%	5	0.1%
(P) C-F [M]	0	0.0%	0	0.0%
Subtotal	468	4.6%	340	6.6%
Miscellaneous/Mixed				
R-A / R-1	1	0.0%	1	0.0%
R-A / A-2-10	1	0.0%	1	0.0%
C-2 / A-2-10	8	0.1%	2	0.0%
Subtotal	10	0.1%	4	0.1%
TOTAL	10,062	100.0%	5,119	100.0%

Source: City of Ceres Land Use Database, February 1993

1.10.3 CITY OF MODESTO GENERAL PLAN

The City of Modesto adopted their *General Plan* in 1996. The City's urban growth policy fosters the "urban village" concept, which requires that urban expansion into the Urban Reserve will occur in comprehensively planned "villages," which would incorporate a mixture of uses and housing alternatives, and a self-supporting financing program, which would be detailed in a Specific Plan and Financing Plan. Expansion of Modesto is also subject to the voter-approved Modesto Citizens Advisory Growth Management Act (Measure A), which requires that any sewer trunk extensions into the Urban Reserve be approved in a general election.

Tuolumne River Regional Park, located primarily north of the river and designated by the City of Modesto General Plan as Major Open Space, lies to the immediate north of Ceres. Modesto's General Plan policies regarding this area call for the continued preservation of the Tuolumne River and adjacent land in its natural state to maintain wildlife, vegetation, and habitat diversity. Adjacent to and north of the park is a significant amount of land designated for industrial uses. The City's policies regarding industrial land uses are particularly relevant to Ceres, since major portions of Modesto's border areas with Ceres are industrially-designated. Guiding policies for the regulation of industrial land uses in Modesto include promoting environmental compatibility and buffers where industrial and residential uses converge, and ensuring that there are adequate transportation links to serve industrial areas.

Table 1-11 lists total acreage and dwelling units within the City of Modesto's zoning districts.

TABLE 1-11					
CURRENT ZONING					
City of Modesto Zoning Districts within General Plan Study Area					
1993					
Category/District		Net Acreage	% of Total	Units	% of Total
Residential					
Low Density	R-1	297	41.7%	1,222	88.2%
Medium Density	R-2	4	0.6%	16	1.2%
High Density	R-3	7	0.9%	0	0.0%
Subtotal		308	43.2%	1,238	89.4%
Commercial					
Neighborhood	C-1	7	1.0%	0	0.0%
General	C-2	1	0.1%	1	0.1%
Highway	C-3	5	0.7%	1	0.1%
Subtotal		13	1.8%	2	0.1%
Industrial					
Light	M-1	2	0.3%	1	0.1%
Heavy	M-2	349	49.0%	2	0.1%
Subtotal		351	49.3%	3	0.2%
Planned Development					
P-D (221)		15	2.2%	142	10.3%
P-D (247)		18	2.5%	0	0.0%
P-D (327)		3	0.4%	0	0.0%
P-D (328)		3	0.5%	0	0.0%
P-D (498)		1	0.1%	0	0.0%
Subtotal		41	5.7%	142	10.3%
TOTAL		712	100.0%	1,385	100.0%
Source: City of Ceres Land Use Database, February 1993					

1.10.4 STANISLAUS COUNTY HAZARDOUS WASTE MANAGEMENT PLAN

Under Section 25135 of the *California Health and Safety Code*, each county in California is required to prepare a countywide hazardous waste management plan which includes information about waste generation, describes existing facilities in the county, assesses the need for new and expanded facilities, analyzes potential for waste reduction, and creates programs for local hazardous waste management.

The HWMP also identifies areas suitable for location of hazardous waste transfer, storage, and disposal facilities. One of the areas identified in the HWMP is located in a large, industrially zoned area in west Ceres. The HWMP and hazardous waste issues are discussed in Chapter 9, *Safety*.

Hazardous waste management plans must be approved by a majority of the cities within the county which contain a majority of the population in the incorporated area of the county. Stanislaus County's HWMP was adopted in 1991 by the County and the cities in the county.

1.10.5 INTEGRATED WASTE MANAGEMENT PLAN

In September 1989, the Governor signed the Integrated Waste Management Act of 1989. This Act established strict mandates for local agencies to achieve a 25 percent per year reduction in solid waste disposed of by 1995 and a 50 percent reduction by 2000. The Act abolished the California Waste Management Board and created the State Integrated Waste Management and Recycling Board. The recommendations concerning state actions needed to maintain an efficient and environmentally safe solid waste management infrastructure.

Each city is required to prepare, adopt, and submit to the county a source reduction and recycling element which includes the following components:

- Waste characterization
- Source reduction
- Recycling
- Composting
- Solid waste facility capacity
- Education and public information
- Funding
- Special waste
- Household hazardous waste

Counties are required to prepare source reduction and recycling elements for unincorporated areas. Each county must also prepare and submit to the State Integrated Waste Management and Recycling Board a countywide integrated waste management plan which includes the cities' and county's source reduction and recycling elements, a countywide siting element, and a summary of significant waste management problems for the county. Counties with less than five years remaining landfill capacity are required to submit, by April 1994; counties with five to eight years of remaining landfill capacity, by August 1994; and counties with more than eight years of remaining capacity (Stanislaus County is included in this category), by December 1994. The county and a majority of the cities within the county that contain a majority of the county's incorporated population must approve the plan. The State Board shall review the plans to determine if they comply with the provisions of the Act. Based on this determination, the Board shall approve or disapprove the plan.

Each countywide integrated waste management plan must be reviewed, revised if necessary, and submitted to the State Board every five years.

City of Ceres Source Reduction and Recycling Element

The City of Ceres published a *Final Draft Source Reduction and Recycling Element* in January 1994. The element contains the following overall goals for source reduction and recycling within the city of Ceres:

- To meet source reduction, recycling and composting waste diversion requirements of the *Public Resources Code* §40051 (Integrated Waste Management Act).
- To improve the education and public information opportunities available to Ceres residents to maximize source reduction, recycling and composting programs selected for implementation.
- To attain the maximum level possible of component integration throughout the *Source Reduction and Recycling Element*.
- To aid in the development of local, regional and statewide markets for commodities diverted through programs selected for implementation in the *Source Reduction and Recycling Element*.

- To increase monitoring efforts relative to state and federal legislative activity where recycling commodities markets may be improved.

The document outlines a number of alternatives for achieving objectives related to these goals. The focus of the plan is on source reduction. Source reduction alternatives identified include rate structure modifications, economic incentives, technical assistance/instructional and promotional alternatives, and regulatory programs.

The *Final Draft Source Reduction and Recycling Element* concludes that the existing facilities have adequate capacity to meet Ceres' projected waste disposal needs through the year 2006. A discussion of solid waste collection and disposal is included in Chapter 6, Public Facilities and Services.

1.10.6 STANISLAUS COUNTY AIRPORT LAND USE COMMISSION PLAN

Under various provisions of state law, cities and counties are required to either bring their general plans and zoning and any specific plan into compliance with the adopted County Airport Land Use Commission (ALUC) plan for territory around designated airports or make specified findings. The purpose of the airport land use plan and the consistency requirement is to eliminate or minimize development around airports that would be subject to significant levels of aircraft noise or would pose a safety hazard to aircraft or occupants of the development in the event of a crash.

In 1978, the Stanislaus County ALUC adopted an *Airport Land Use Commission Plan* for five airports under its jurisdiction. As part of the plan, the ALUC established planning area boundaries around each airport and developed land use plans within these boundaries, including recommending compatible land uses and recommending height restrictions and building standard for soundproofing within the planning area boundaries. The ALUC plan divides the airport planning regions into four areas: 1) airport building area; 2) other airport property; 3) approach and transitional surfaces; and 4) other lands within the airport planning boundary. The Modesto City-County Airport (Harry Sham Field) lies just north of Ceres on the north side of the Tuolumne River. Part of the approach and transitional surfaces zone and other lands within the planning area fall within the Ceres' city limits and Study Area. The ALUC Plan does not list any uses as incompatible with "other lands within the airport planning boundary."

In 1989, Ceres submitted the *Mitchell Road Corridor Specific Plan* (MRCSP) to the Stanislaus County ALUC for its review and determination regarding the consistency of the MRCSP with the *Airport Land Use Commission Plan* for the Modesto City-County Airport as required by law. The ALUC determined that certain uses and densities of land uses permitted by the MRCSP on properties located under the approach and transitional surfaces were in conflict with the ALUC Plan. Because the City believed that the land uses and densities of proposed MRCSP did not compromise the public health, safety, and general welfare, or otherwise limit the operations of the airport, the Ceres City Council voted to override the ALUC's determination as is provided by law (a two-thirds vote is required to override).

The California Aviation Council filed a lawsuit seeking to have the City Council's override of the ALUC's determination declared unlawful because the City Council did not have substantial evidence to support override findings. The City prevailed at the trial court level, but the appellate court overturned the trial court, holding that the City Council's finding to override the ALUC's original determination need to be supported by substantial evidence since they were "adjudicative" rather than "legislative" in nature. The court subsequently invalidated the MRCSP north of Hatch Road.

In 1994, the City amended the MRCSP to add policies and land use restrictions that are consistent with the ALUC's determination for those properties that are located under the approach and transitional surfaces adopted the amended MRCSP to the area north of Hatch Road.

1.10.7 MODESTO CITY-COUNTY AIRPORT MASTER PLAN REPORT

The *Modesto City-County Airport Master Plan Report*, was prepared by Hodges & Shutt for the City of Modesto in February 1990 and the Final EIR was certified in April 1993. This report is more recent than the ALUC Plan and discusses current plans for future development at the airport.

Although local land use plans, ordinances and policies have been the principal means for ensuring land use compatibility in the airports' vicinity, development proposals for the area are voluntarily referred to the airport manager for review. Compatibility standards are generally based on height limitations and noise compatibility criteria within airport approach/departure and overflight zones (see Figure 1-7), with the intent of insuring safety to those in flight and those on the ground.

The *Airport Master Plan Report* recommends that the Airport Land Use Commission reexamine the ALUC Plan for Modesto City-County Airport based on the information contained in the *Airport Master Plan* and make any necessary modifications. It recommends specifically that rural densities (1 dwelling units per 10 acres) be maintained within the approach zone to the southeast sector of the airport overlying Ceres. The City of Ceres has historically disagreed with this standard, finding it to be excessive.

1.11 INSTITUTIONAL SETTING

In addition to the City of Ceres, several other governmental agencies and special districts exercise some level of regulatory control over land use or provide some community service in the Ceres area. Besides those regulatory agencies with direct permitting authority, several local, state, and federal agencies are involved with the permit and environmental process. These agencies, while not issuing permits, have particular areas of expertise or maintain certain review authority and may comment on various aspects of project development.

This section summarizes the responsibility and permitting authority of those agencies, commissions, and districts which have the greatest relevance to development, resources, and activities within the Study Area. Many of the community services these agencies provide and the status of the natural resources they are empowered to protect are discussed at length in subsequent chapters of this *Background Report*.

1.11.1 COUNTY AGENCIES

County of Stanislaus

The County of Stanislaus is a political administrative unit of the State of California. The County functions both as an agent of the state for certain activities and as a local government. For planning and regulating land use and development, the County must exercise its police power authority consistent with the State Planning and Zoning Law and numerous other laws. The County's legislative body is the five-member Board of Supervisors. Board members are elected by district to staggered four-year terms. Development in unincorporated areas are subject to regulation under the *Stanislaus County General Plan, Zoning Ordinance, Subdivision Ordinance, and Building, Mechanical, and Plumbing Codes*.

1.11.2 REGIONAL AGENCIES

Stanislaus County Local Agency Formation Commission (LAFCO)

The authority and responsibilities of LAFCO are discussed in Section 1.9 earlier in this chapter.

Stanislaus Area Association of Governments (SAAG)

SAAG is a voluntary association of Stanislaus County and the nine cities in the county. SAAG is composed of the five county supervisors, three representatives of the City of Modesto, and one representative each from the cities of Ceres, Hughson, Newman, Oakdale, Patterson, Riverbank, Turlock, and Waterford. SAAG is the Federally-designated Metropolitan Planning Organization for transportation, the Areawide Housing Organization, and the Metropolitan Clearinghouse. SAAG is responsible for preparing the Regional Transportation Plan and Congestion Management Plan for the county.

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)

The SJVUAPCD was formed by the eight San Joaquin Valley counties, including Stanislaus, to address regional air quality issues. The Unified APCD seeks to set and enforce rules and air quality plans for the entire valley, make permit processing uniform throughout the valley, and monitor the environmental impact of proposed construction throughout the valley. The agency is responsible for developing an implementation plan for attainment of ambient air quality standards for key pollutants, and monitoring and regulating stationary sources of regional air pollution. The APCD is responsible for granting two types of permits which pertain land use. The first, the Authority to Construct, is required for any proposal to construct, modify, or operate a facility or equipment that will emit pollutants from a stationary source in the atmosphere. The second, the Permit to Operate, must be obtained from the APCD to ensure compliance with requirements implemented with the Authority to Construct. The Permit to Construct includes a renewal requirement which creates an ongoing monitoring program. The

current status of air quality conditions in the Study Area is discussed in Chapter 8, *Natural and Agricultural Resources*.

1.11.3 STATE AGENCIES

California Department of Fish and Game (CDFG)

CDFG manages the fish and wildlife resources of the state. The Fish and Game Commission establishes policies and regulations to be implemented by the CDFG. The California Fish and Wildlife Plan (1986) guides the overall management, and the Fish and Game Code is the regulatory guide. The CDFG has authority over two permitting processes. Streambed alteration permits are required for projects which alter the flow of any lake, stream or river in the state. Suction dredging permits are required for projects involving suction or vacuum dredging activities in state waterways. CDFG reviews projects and comments on potential impacts to fish and wildlife resources in general, and identifies potential impacts to endangered or threatened plant or animal species under the California Endangered Species Act. The Department is required to issue a written finding indicating whether a proposed project would "jeopardize" the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of habitat essential to the continued existence of the species. If the Department makes this "jeopardy" finding, it is then required to develop "reasonable and prudent alternatives" to conserve the endangered or threatened species.

Department of Water Resources (DWR)

DWR has a wide range of functions, including formulation of coordinated plans for the control, conservation, protection, and use of state water resources. DWR collects information on the quality and quantity of surface and groundwater resources. DWR is guided by the *State Water Plan* and utilizes the regional water quality control boards to carry out many functions. Water development plans prepared by others are reviewed by DWR. The State Water Project that delivers water via the California Aqueduct is operated by DWR.

State Water Resources Control Board (SWRCB)

The SWRCB has two primary responsibilities: administration of water rights and control of water quality. Together with the nine regional water quality control boards (see discussion below), SWRCB regulates California's water resources and has responsibility for water rights and pollution control. The SWRCB directs regional boards to plan and enforce water quality standards within their boundaries.

State Reclamation Board (SRB)

The Reclamation Board regulates land around the San Joaquin River and other Central Valley streams, including the Tuolumne River, to maintain the integrity and safety of flood control project levees and floodways in the Central Valley and to prevent encroachments that could impair flood-flow capacities. Activities around the Tuolumne River that would require an encroachment permit from the Reclamation Board include: construction of retaining walls, steps, walkways, boating facilities, buildings, bridges, access ramps and fences; removal or deposit of earth; landscaping; and installation, sealing, or removal of irrigation and drainage pipes, gas mains, and power, communication, water, and sewer lines.

Central Valley Regional Water Quality Control Board (CVRWQCB)

This agency is one of nine subunits of the State Water Resources Control Board and is responsible for evaluating and establishing discharge requirements to protect water quality in the Central Valley. This agency is responsible for regulating Ceres' wastewater treatment plant discharge permit.

California Department of Transportation (Caltrans)

Caltrans is responsible for the maintenance and administration of the California highway system, including State Highway 99. Caltrans has authority over all state highways and freeway rights-of-way, including easements and undeveloped rights-of-way which have been acquired in anticipation of future construction. Any project which proposes to construct a road connection, widen an overpass, or perform earthwork within a State highway or freeway must obtain an encroachment permit from Caltrans.

California Public Utilities Commission (CPUC)

The CPUC is an independent state commission that regulates the service and rates of privately-owned water, sewer, gas, electric, telephone, and transportation utilities and/or companies. The CPUC regulates the routing, design, construction, and operation of intrastate transmission lines and pipelines.

Integrated Waste Management Board (IWMB)

The IWMB was created in 1989, and replaced the California Waste Management Board as the state regulatory body for solid waste. The IWMB's duties are to review county and city source reduction and recycling elements and to make recommendations concerning state actions needed to maintain an efficient and environmentally safe solid waste management infrastructure.

Department of Health Services (DHS)

The DHS regulates hazardous wastes through its Toxic Substances Control Division. The DHS classifies wastes according to their toxicity, and regulates the disposal of hazardous wastes. DHS also licenses and inspects hazardous waste disposal facilities, reviews and certifies County Hazardous Waste Management Plans, and administers the State Superfund for the cleanup of toxic waste sites. DHS implements drinking water quality standards promulgated by the federal EPA and monitors operation of the City's water system for water quality.

California Air Resources Board (CARB)

The CARB has responsibility to control air pollutant emissions and to improve air quality throughout the state. Much of this planning responsibility is delegated to the local air pollution control districts. The CARB sets motor vehicle emission standards, oversees the activities of local air quality agencies, and is responsible for administering the California Clean Air Act.

California Department of Parks and Recreation (CDPR)

The CDPR reviews development projects in relation to State recreation facilities. The State Office of Historic Preservation within the CDPR is the designated State Historic Preservation Office (SHPO) and monitors local, state, and federal registered historical resources.

California Native American Heritage Commission (CNAHC)

The CNAHC reviews projects and comments on potential impacts to Native American archaeological resources. The Commission is directly involved with a procedure if Native American artifacts or remains are discovered during construction activities.

1.11.4 FEDERAL AGENCIES

U.S. Geological Survey (USGS)

The Water Resources Division of USGS provides information on quantity, quality, availability, and movement of the surface and underground water resources of the nation. This information is published yearly in four volumes for California.

Soil Conservation Service (SCS)

SCS develops land use capability information through the National Cooperative Soil Survey. This program uses standardized criteria to classify and map soils and provides the information to planners and landowners. SCS also provides management guidance to landowners through a conservation planning program to improve productivity primarily through erosion control methods. SCS works closely with the Agricultural Stabilization and Conservation Service (ASCS) to provide documentation and planning assistance to qualify landowners for ASCS cost-share funding for projects.

Environmental Protection Agency (EPA)

EPA is an independent federal agency that coordinates governmental action to protect the environment by abating and controlling pollution on a systematic basis. The EPA administers the Federal Clean Air Act, the Safe Drinking Water Act, and administers national programs on water pollution control. The State Water Resources Control Board (SWRCB) is the state agency responsible for disbursing funding and

applying EPA water quality rules. The EPA regulates hazardous waste injection wells, sets standards for land disposal of hazardous wastes, and administers the federal Superfund to clean up toxic waste sites.

Federal Emergency Management Agency (FEMA)

FEMA is responsible for coordinating all federal emergency preparedness, mitigation, and response activities, including hazard mitigation, preparedness planning, relief operations, and recovery assistance. Flooding is one of the agency's main concerns. FEMA has conducted a flood hazard study for Stanislaus County to determine the 100-year floodplain and develop flood insurance rate maps (see discussion in Chapter 9, *Safety*).

United States Fish and Wildlife Service (USFWS)

USFWS is responsible for management and protection of threatened and endangered species, migratory birds, certain marine mammals, and inland sport fisheries. Under authority of the Fish and Wildlife Coordination Act of 1936, USFWS staff reviews and comments on projects that could impact wildlife or fish populations in the project area.

U.S. Army Corps of Engineers

The Corps undertakes water supply and flood control projects, and issues permits for construction along rivers, beaches, and lakes through Section 404 of the Clean Water Act. The Corps must also approve wetlands conversions in cooperation with the EPA.

1.11.5 SPECIAL DISTRICTS

Ceres Unified School District (CUSD)

The CUSD provides public K-12 education services to the greater Ceres area. Its school services are discussed in Chapter 6, *Public Facilities and Services*.

School districts are subject to special legal requirements relating to city or county land use regulation. Under state law (*Government Code* §53094), school facilities must be constructed according to the provisions of the applicable city or county zoning ordinance, unless a vote by two-thirds of the school board renders the zoning inapplicable, except when the use of the property by the school district is for nonclassroom buildings, including warehouses, administrative buildings, automotive storage, and repair buildings.

Turlock Irrigation District (TID)

The TID has with a service area of approximately 200,000 acres (south of the Tuolumne River) and delivers irrigation water from the Tuolumne River to its agricultural customers via the Turlock Canal. In 1923, the TID and Modesto Irrigation District (MID) built the Don Pedro Reservoir in a joint effort. The reservoir has a 290,000 acre-feet capacity. In 1971, the New Don Pedro Reservoir, with a 2,030,000 acre-feet capacity, was completed.

Surface water is diverted downstream from the New Don Pedro Reservoir at La Grange Dam. The canal system, most of which is concrete-lined conveys approximately 600,000 acre-feet per year. The canal also flows through Turlock Lake (49,000 acre-feet capacity).

TID also provides electricity to the city of Ceres and the Study Area.

1.12 FINDINGS

- For the purposes of the General Plan Update, the City defined a Study Area that is bounded by the Tuolumne River on the north, Grayson Road on the south, Carpenter Road on the west, and Washington Road on the east (see Figure 1-2). In addition to all of the incorporated city, the Study Area covers parts of unincorporated Stanislaus County (about 10,060 net acres) and the City of Modesto (approximately 712 net acres). The part of Modesto in the northwest Study Area was included for analytical purposes only (i.e., to evaluate traffic impacts); it is not contemplated as a future part of Ceres.
- Prior to adoption of this General Plan, the City of Ceres General Plan consisted of eight individual elements adopted at various times over that last 20 years, and the *Mitchell Road Corridor Specific Plan*, which acts as both general plan and zoning for the area. With the exception of the *Housing Element* and the *Mitchell Road Corridor Specific Plan*, these elements were consolidated and superseded through the adoption of the updated General Plan.
- Two redevelopment areas are located within the Study Area. The Ceres Redevelopment Project Area covers land within the city limits. The Stanislaus-Ceres Redevelopment Project Area covers two areas north and south of the city within Ceres's sphere of influence.
- Over half of the land within Ceres' city limits is devoted to residential uses, almost 10 percent to commercial uses, 4 percent to industrial uses, 17 percent to institutional uses, and 18 percent is vacant. The part of the Study Area within the Modesto city limits is about 30 percent industrial, 28 percent residential, 13 percent institutional, and 27 percent vacant land (not in agricultural production). The unincorporated part of the Study Area is predominately agricultural, with 73 percent devoted to agricultural uses. Another 15 percent of the land is residential, 4 percent industrial, less than 2 percent commercial and institutional, and 6 percent is vacant.
- The Stanislaus County Local Agency Formation Commission establishes Ceres' sphere of influence and approves annexations to the city. Ceres' current sphere of influence was formally adopted by the Stanislaus County LAFCO in December 1984. LAFCO operates under the provisions of state law and its *Policies and Procedures Manual*.
- Land uses in the unincorporated Study Area are governed by the Stanislaus County General Plan and zoning. Outside Ceres' sphere of influence, land uses are designated for agriculture.
- The Stanislaus County Airport Land Use Commission Plan addresses land uses around the Modesto City-County Airport. The Plan calls for very low density development south of the airport in Ceres and the appropriate land use densities in the area have been the subject of litigation.
- Numerous governmental agencies have permitting or review authority over activities in and around Ceres.

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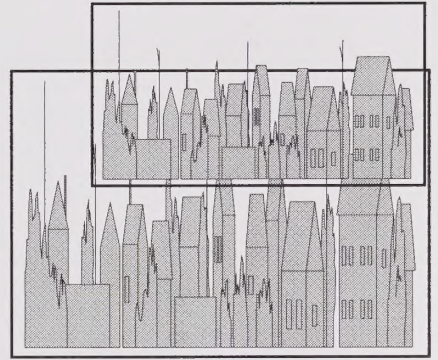
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CHAPTER 2

URBAN FORM AND DESIGN

CHAPTER 2 URBAN FORM AND DESIGN

2.0 INTRODUCTION

This chapter describes the form, structure, and appearance of Ceres' physical environment, including both natural and manmade elements. The focus of the chapter is on the positive attributes and elements that give the city its distinctiveness, as well as those that constitute liabilities. The purpose of the chapter is to provide an inventory and assessment that will inform and guide decisions concerning the enhancement of the quality and coherence of the built environment. Topics addressed include urban design, urban form and structure, scenic resources, city entrances, and the visual quality of major roadways.

2.1 SETTING

Ceres is located in California's Great Central Valley, a vast, relatively flat depositional plain dominated by agricultural land uses. The surrounding landscape is characterized by row crops, pastures, orchards, and vineyards. Along most of its northern boundary, the city of Ceres is separated from the city of Modesto by the Tuolumne River, while part of the city's western boundary is shared with southern Modesto. The town of Keyes is situated less than a mile from the southeastern corner of the city. State Route 99 (a limited access freeway) runs diagonally from northwest to southeast across the city, dividing the community into two distinct areas.

2.2 URBAN PATTERN

2.2.1 ORIGIN

The original Ceres townsite, as delineated on the first recorded map of the town dated February 20, 1875, was triangular in shape. It was defined by two streets--Sixth and Magnolia--and the Central Pacific Railroad alignment. Thus, from the very earliest days, this triangular configuration and the barrier imposed by the rail alignment served to contain the urban pattern on the southwestern edge of the city, directing growth to the north and east. Historically, the downtown area was considerably larger than it is today, but much of the older business district was covered over when Route 99 was expanded to a freeway and the Pine Street overpass was constructed. This historic core is currently defined by Route 99, Whitmore Avenue, and Ninth Street, although there are some historic structures on the west side of Route 99, along Central and Hackett Avenues. A modest but fine stock of historic residences and some commercial structures link this core area with the city's past.

2.2.2 CIRCULATION

Outside this historic civic and commercial core, the dominant organizing elements are the major boulevards, located along old township and section lines, forming a one-mile grid over the urban pattern. There are three primary east-west streets--Hatch Road, Whitmore Avenue, and Service Road--and three primary north-south streets--Morgan Road--Herndon Road (north of Hatch Road), Central Avenue, and Mitchell Road. These six streets, along with State Route 99, serve to organize the urban structure of the city and thus the internal form of the urban pattern. Figure 2-1 illustrates this organizing circulation pattern. The three east-west streets bridge State Route 99. Other than Mitchell Road on the eastern edge of the city, the north-south streets are not continuous. Parts of the city are therefore essentially isolated by virtue of this discontinuous circulation system. Crows Landing Road, near the western boundary of the city, Mitchell Road on the east, and State Route 99 provide vehicular access to Modesto. South Ninth Street and South Seventh Street also provide important links to Modesto, as well as serving one of the major industrial areas of the city.

The street system occurring within the framework established by these major streets is reflected in several street patterns. The historic residential area is characterized by grid street patterns. The area defined by State Route 99, Hatch Road, and Central Avenue, and the historic residential areas west of State Route 99 are typical of the historic grid street pattern. Older residential areas contiguous to the historic residential area are also characterized by a rectangular street pattern, but the urban form is dominated by typical post-World War II subdivision patterns, characterized initially by cul-de-sacs within a rectangular street pattern, and then by curvilinear streets. This pattern becomes more pronounced further north and east of the historic commercial core, and west of State Route 99 south of Whitmore Avenue.

2.2.3 CITY ENTRANCES

The State Route 99 corridor provides the major access for north- and south-bound traffic into Ceres. Secondary points of access linking Ceres to Modesto are South Ninth Street on the north, Mitchell Road on the east and Crows Landing Road on the west. Hatch Road and Whitmore Avenue connect the city to the agricultural lands to the east and to southern Modesto to the west. Crows Landing Road is the principal secondary link to the agricultural area to the southwest, and Central Avenue and Morgan Road provide less important links to the south.

Because there is little visual distinction between the city and the contiguous landscapes and cityscapes, none of these streets or highways provide a clear or coherent gateway into Ceres. Absent a clear sense of arrival in a differentiated and distinctive place, these circulation elements merely provide access into a

political jurisdiction. There are a number of logical points along these access routes where the development of city gateways would serve to differentiate Ceres from Modesto, and to create a distinctive sense of arrival into the city.

2.2.4 VISUAL DEFINITION, ORIENTATION, AND QUALITY

Because any vertical elements are particularly visible in Ceres' relatively flat topography, tall objects such as water towers and freeway overpasses tend to take on added importance in terms of their visual effect and role in giving definition to the city. The tree cover is also an important visual element in Ceres since there are few tall buildings and virtually no topographic features. The lack of a coherent street pattern, however, minimizes the central organizing function that street trees could play in the city's urban structure.

Although the Tuolumne River is a valuable scenic resource, it is not a major defining element in the landscape. The physical landscape surrounding the river and the pattern of property ownership along the river tend to obscure it from all but a few public views on the Ceres side of the river. Modesto, on the other hand, enjoys fine access to and views of the river through American Legion Park, Tuolumne River Regional Park, and the Dryden Municipal Golf Course. The River Oaks Golf Course in Ceres offers fine views of the river, but is not in public ownership.

The skyline of downtown Modesto is visible from the surrounding agricultural landscape and from selected points within Ceres, as well as from northbound State Route 99. The visual prominence of Modesto effectively relegates Ceres to a suburban role in the structure of the metropolitan area. The fact that Modesto is so much larger than, and contiguous to Ceres, is at the core of a number of complex issues concerning Ceres' identity. Foremost among these is that the highly-valued small town character of Ceres is realized only from within the city when the visual distance from and relationship to Modesto is obscured by the landscape. The mature tree cover characteristic of much of the city is, therefore, absolutely essential to the internal image of Ceres.

The State Route 99 corridor is predominately commercial and industrial in nature; views of Ceres from State Route 99 and the initial impression of the city from some Route 99 off-ramps are adversely influenced by the domination of industrial and heavy commercial uses. The visual image created by this initial exposure is detrimental to the overall character of Ceres, since the city is far more attractive than is evident from the principal points of entry. The establishment of greater differentiation from Modesto and the creation of more attractive visual linkages between Route 99 and the city would enhance Ceres' image.

The visual character of the major boulevards in Ceres is often dominated by linear commercial development, although the quality of some of this development is quite high by commercial standards. Strip development along some segments of these major boulevards, however, create a rather low visual quality. Since the overall image of the city is largely created by these major streets, they represent an important urban design issue. Moreover, a number of segments along these primary streets are defined by privacy walls separating residential development from the street. The uninviting character of most of these walls, and in several areas, irrigation canals with no related landscaping, further contribute to low visual quality in some areas of the city.

2.3 URBAN DESIGN DISTRICTS

To a large degree, the types of development within Ceres define the character of the city, since no external element provides distinctiveness (e.g., views of a bay or lake, or mountain). With the exception of the view from State Route 99, virtually all views of the city, and hence the visual perception of Ceres is derived from views of the immediate urban landscape--streets, street trees, and buildings. Accordingly, this section is organized primarily in terms of development types, since they, along with the mature trees, represent the primary visual quality of Ceres. Except for the small, historic downtown area, the city's development pattern consists of residential areas within large blocks defined by the major boulevards and commercial areas either in strips along major boulevards or in clusters at major intersections. There are also several industrial areas, most of which are adjacent to Route 99. Figure 2-2 shows these elements in diagrammatic form.

The elements described above combine to organize the urban pattern of Ceres, albeit with little coherence and marked qualitative differences within the various areas. Perhaps most importantly from an urban design perspective, the absence of a vital and active downtown area results in the lack of a clear and

definable center or heart to the city. Furthermore, the existing development pattern does not provide obvious precedents for expanding or reorganizing the urban fabric.

For the purposes of describing and discussing urban design issues, the Study Area has been divided into the following five districts:

1. Historic downtown area;
2. Residential areas (further subdivided into subdistricts as discussed below);
3. Commercial strips along major boulevards;
4. Commercial nodes at major intersections; and
5. Industrial areas.

Each of these districts is briefly described in the following paragraphs.

2.3.1 HISTORIC DOWNTOWN AREA

The historic downtown core was the subject of an urban design study in 1991. The resulting report, *Ceres Downtown Design Guidelines*, provides a useful starting point for the revitalization of this area. The problems facing the historic downtown area, however, will require much more than urban design guidelines to restore the significance of the area within the city. Concern over the decline of this historic commercial core is well founded; there are a number of vacant buildings and vacant parcels, as well as a number of marginal businesses. As noted in the 1991 study, "the City could literally grow away from the old center and render it an insignificant element of the city of Ceres." While the design guidelines set forth in the report are basically sound, they lack a strategy to link this increasingly isolated area to the larger urban context and to provide more vital and active functions for the area.

The blocks in the historic downtown area are elongated rectangles measuring approximately 480 feet in the north-south direction by 240 feet along the east-west axis. The north-south streets terminate at Route 99, creating trapezoidal or triangular blocks at the southern end of the district. Alleys divide most of the blocks along the north-south axis. On-street parking throughout the district is parallel, except for the commercial segment of Fourth Street, where diagonal parking is provided. Streets in the historic downtown are 60 feet wide, with adjoining 10-foot sidewalks characteristic of the commercial areas, and 5-foot sidewalks with 5-foot planted parking strips in the residential areas. (Streets in some residential areas have been reduced to 40 feet in width as a result of reconstruction). This circulation configuration, which is typical of older downtowns, creates a well-scaled pedestrian environment, but could pose problems if parking were to become a critical issue.

Although this historic area contains the original commercial core of Ceres, residential development dominates the district. Commercial activities are limited to a two and a half block segment of Fourth Street between El Camino Street and mid-block between North Street and Magnolia Street, with a scattering of commercial uses on Third and Fifth Streets. The Civic Center (which includes City Hall and the Public Safety buildings) and other public/quasi public uses occupy the equivalent of two and one-half city blocks between Magnolia Street and North Street. Whitmore Park provides a strategic open space directly south of the Civic Center. The balance of the district is predominately older homes. There is a substantial concentration of civic and public uses in or directly adjacent to the district. In addition to the Civic Center and the court building and library, Ceres High School lies immediately to the north and Walter White Elementary School and the Ceres School District offices are to the east.

There are a number of historic structures remaining in the downtown, and only a very few more contemporary structures are wholly out of character with the historic precedents. The nature of development in this district is clearly typical of the "small town character" highly valued by local residents. Commercial buildings are a mix of one- and two-story, and most are constructed as small, independent structures. Although some structures in the area are not in excellent condition, the building stock is visually interesting and well-oriented to pedestrian uses, both spatially and architecturally. Because of the strength and clarity of the historic pattern and scale, elements which do not conform are particularly apparent.

2.3.2 RESIDENTIAL AREAS

Residential development in Ceres can be characterized at several scales. First, there is a general coherence of housing type and street patterns that can be defined by the major street pattern discussed earlier in this section. At a general level, the large grid pattern formed by the major east-west streets (River Road, Hatch Road, Whitmore Avenue, and Service Road) and the major north-south streets

(Crows Landing Road, Morgan Road, Central Avenue, and Mitchell Road) serves to define the overall residential character of the housing contained within each of these "super-blocks." This is the case on both sides of State Route 99. For example, the housing stock contained within the super-block defined by Hatch Road, Central Avenue, Whitmore Avenue, and Morgan Road is substantially different in street and lot pattern and housing type from the contiguous super-block to the east that is bounded by Hatch Road, Central Avenue, Whitmore Avenue, and Mitchell Road.

Each of the nine primary super-blocks serves to define a distinctive housing area. Thus, for urban design purposes, each of these super-blocks serves as a residential subdistrict. Since the major streets are the only cross-town thoroughfares, the street system within the super-blocks carries far less traffic at significantly slower speeds and is hampered by barriers such as cul-de-sacs, further reinforcing the subdistrict function of these super-blocks. Since the major thoroughfares serve as significant barriers to safe and easy pedestrian movement, the super-blocks tend to be isolated from one another.

Those blocks that are contiguous to, and divided by, State Route 99 tend to have not only the older street patterns and housing stock, but also a less homogenous housing stock. The level of homogeneity of housing type and appearance increases as the distance from the State Route 99 corridor increases. New housing development located along these major streets is characterized by sound walls that give these areas a stark, lifeless, and uninviting appearance.

Finally, the tree canopy is a central urban design element in the residential neighborhoods in Ceres. Typical of urban settlements in the Central Valley, street trees and trees on private property serve not only to temper the hot summer temperatures, but also to provide high visual quality to the neighborhoods. In Ceres, the limited access to the Tuolumne River along the southern edge of the river and the relatively small number of city parks is offset to some degree by the presence of the tree canopy, particularly in those areas where the vegetation is more mature. This tree cover provides not only an important visual amenity, but it also serves to unify the aesthetic character of the residential neighborhoods.

2.3.3 STRIP COMMERCIAL AREAS ALONG MAJOR BOULEVARDS

Significant stretches of Ceres' major thoroughfares are characterized by strip commercial development. In some areas, this development form consists of newer buildings that are relatively well maintained, while other sections contain older structures that are maintained at varying levels of quality; this creates the visual dissonance typical of strip development. The lack of major street tree plantings along these commercial strips, combined with the dominance of wide streets and large parking areas in front of commercial structures, serves to create a development form that is devoted entirely to the automobile, and decidedly out of scale with "small town character." Moreover, strip commercial development tends to dominate the appearance of large segments of the major thoroughfares, thus adversely affecting the overall visual quality of the city.

2.3.4 COMMERCIAL CLUSTERS AT MAJOR INTERSECTIONS

Clusters of commercial development occur at most of the intersections on the major street grid, so the structure of the commercial development pattern is a series of nodes without a clear center. Since these nodes have displaced the historic commercial downtown core and its dual role as the center of commercial and public life, these commercial centers have taken on the functions typically served by the central business district. Given the absence of a viable central business district in Ceres, residents use these centers for retail shopping, dining, and entertainment, thus further diluting the activity level in the historic downtown core.

In terms of their physical form and appearance, these commercial nodes tend to occupy all four corners of major intersections, with large parking areas proximate to and clearly visible from the major streets. Many of the centers include large commercial structures, although in most cases, the larger structures are set back a considerable distance from the street. As a result, the building scale of these nodes is not particularly distracting as viewed from the major street system, although there are significant scale differences between the commercial uses and the nearby residential development.

As is the case with the strip commercial development described above, this development form is decidedly automobile-oriented, and thus creates large auto-dominated pockets or holes within the urban fabric. Although some nodes are considerably larger than others, none can actually serve as a true city center due to the nature of the overall pattern. Moreover, it is clear that these commercial centers will continue to play an important role in the physical structure and use patterns of the city, and that they

warrant more careful urban design attention in order to better integrate them into the larger development pattern and to make the entire city a more attractive and coherent place for residents and visitors alike.

2.3.5 STATE ROUTE 99 CORRIDOR INDUSTRIAL COMPLEX

The State Route 99 corridor is dominated by industrial uses (and some heavy commercial uses) that form a near-contiguous land use barrier and separation between the eastern and western areas of the city. In the northern part of the Study Area, the sheer width of this corridor creates a major break in the residential pattern, and, combined with the alignments of State Route 99, the Southern Pacific Railroad, South Seventh Street, and South Ninth Street, constitutes a major barrier to east-west traffic and an impediment to development continuity. The visual character of this northern part of the corridor is dominated by derelict industrial uses that are generally in blighted condition and have very low quality buildings. Because this industrial area is south of the Tuolumne River, it is identified more with Ceres than with Modesto, although some of it is within the Modesto city limits.

That portion of the State Route 99 corridor located between Hatch Road and Whitmore Avenue is considerably less intrusive than the northern section. The character of the industrial uses located in the triangle formed by Morgan Road, Whitmore Avenue, and State Route 99 is decidedly more consistent with the contiguous residential and commercial uses, and the overall quality of development is much higher.

In the southern part of the corridor--the area located between Whitmore Avenue and Service Road--industrial uses are more similar to those directly to the north, although the domination of lower quality industrial buildings at the junction of the built environment is located at a strategic point between the eastern and western sides of the city. Given the likelihood that a substantial portion of the future growth of the city will occur to the west and to the south, Whitmore Avenue and Service Roads will increasingly become the most important streets in terms of linking eastern and western Ceres. As a result, the type and quality of development along these east-west connections will play a key role in defining the overall image of the city.

2.4 PHYSICAL FACTORS INFLUENCING OVERALL URBAN FORM

The form and structure of cities is in part the result of physical factors, and part a consequence of economic, social, and political forces. Cities are also shaped in part by their role within the larger physical and economic context. Ceres, once a small independent settlement, is now part of a growing metropolitan complex in the center of Stanislaus County. The city of Modesto is contiguous to the north and northwest, the community of Hughson is situated less than three miles to the east, and the community of Keyes is less than one mile to the south (with the city of Turlock only another three miles to the south). Moreover, Modesto is encroaching to the south along the western edge of Ceres. Since Modesto is a major and growing population center and State Route 99 represents an important transportation, and thus, urban growth corridor, it is important to understand the forces that are both shaping and constraining the city's urban form and structure.

Ceres, like many cities and towns in the Central Valley, has its roots in the heyday of rail transportation, so the railroad was a primary determinant in the original form and structure of the urbanization pattern. In cases where major highways ran parallel to the railroad alignment, this transportation corridor took on an even more important organizing influence. In the case of Ceres, not only have the rail and highway alignments served as key organizing elements, they have subsequently become a major physical and visual barrier, separating the city into two parts, with the eastern and western halves tenuously connected by only three major streets--Hatch Road, Whitmore Avenue, and Service Road. Even these linkages are weak, given the fact that they consist of freeway overpasses that break the visual continuity between the two sides of the city. These three streets and their relationships to the State Route 99 corridor, as well as the development at these critical junctions and nodes are, therefore, key factors influencing the form and character of the city.

A second major physical factor influencing the overall form of the city is the Tuolumne River. Although obscured from view from most of Ceres, the river represents both an important barrier and a potential source of identity. The proximity of major public open space on the northern side of the river is an important amenity, although access to the area from the Ceres side of the river is very limited. The City is currently conducting a planning and design study for a pedestrian/bicycle bridge over the river to provide access to the park for Ceres residents.

Located only one mile to the south along State Route 99, the town of Keyes is another important physical factor influencing the Ceres growth pattern. Since the southern edge of the Study Area is contiguous with the northern edge of Keyes, the issue of open space separation between urban areas is critical. The natural economic tendency for development to follow major transportation routes could make it difficult to maintain such separation.

While agriculture has long been a major force in the character of the Central Valley landscape, in recent years it has become increasingly at odds with the urban settlements that initially grew up in conjunction with agriculture. Agricultural lands constitute an important physical factor influencing the urban pattern on the eastern edge of Ceres. While the metropolitan Modesto development pattern, including development of the County public safety/social services complex, has fragmented agricultural lands to the west, agricultural operations to the east and south of Ceres are relatively intact and not interrupted by the pattern of gradual suburbanization or urbanization. Development of the new school east of Ceres has broken into the agricultural landscape. Overall, however, the presence of viable and valuable agricultural land is a significant development constraint along the eastern and southern edges of the city.

The complex pattern of jurisdictional boundaries represents an important institutional factor in terms of shaping growth patterns to the west. The mix of county lands, lands under the jurisdiction of the City of Modesto, and lands within the city of Ceres, pose complex and difficult political issues. Whitmore Avenue and Service Road are the key physical factors influencing this issue, because they provide Ceres with the only continuous and unencumbered access to land for city expansion to the west. If the city grows to the south, Whitmore Avenue will increasingly become the most central east-west street in the city. The role of Whitmore Avenue and Service Road take on even greater importance as the key organizing transportation elements in Ceres given the fact that the two central north-south streets--Morgan Road and Central Avenue--are discontinuous, thus making important north-south transportation linkages problematic within the city.

Recently completed Stanislaus County public safety and social services facilities at the intersection of Crows Landing Road and Hackett Road constitute yet another important factor influencing the future urban form of Ceres. The presence of a major employment center adjacent to the western edge of the city provides a strong attraction for future expansion of the greater metropolitan area. Moreover, the demand for commercial and professional uses is likely to follow the opening of the new County facilities, thus placing increased development pressure on adjacent land, which could lead to jurisdictional competition for control over these increasingly valuable future development sites.

2.5 FINDINGS

- Ceres' original townsite is characterized by a small but distinctive, clearly-defined, formal urban pattern that provides a solid framework around which to organize a larger and more vital urban center. This historic core, however, no longer functions as the Central Business District.
- The presence of a number of suburban commercial nodes preempts the economic revitalization and restoration of the downtown core to its original historic role. As a result, the city must create a new "center" while finding a new role for the downtown. These two challenges should be explored in concert with each other.
- State Route 99 severs the city into two separate parts, with very limited physical and visual connections between the eastern and western halves. Stronger linkages between the east side and the west side need to be created.
- Six or seven major boulevards constitute the primary organizing framework for the urban pattern, although the streets themselves lack distinctiveness and character.
- The quality of the residential neighborhoods is augmented by an extensive tree cover that provides a high quality scenic amenity for the city. This tree cover should be reinforced and selectively expanded to give greater coherence to the overall ambience and character of the city. Particular attention should be given to the role of street trees along the major boulevards. The extensive tree cover provides a high quality scenic amenity that should be reinforced and selectively expanded to give greater coherence to the overall urban structure.
- Land uses constitute the primary building blocks of the urban pattern, but there is little coherence to the overall pattern, and the visual character along most major streets fails to reveal the higher quality manifest in most residential areas. This low visual quality is in part due to privacy walls, and in some areas, is exacerbated by the presence of unlandscaped canals that run parallel to major boulevards.
- Commercial uses, organized either in strip or intersection clusters, dominate the visual quality of the major thoroughfares. This scale of development, combined with its obtrusive nature, has a significant adverse influence on the quality of the built environment.
- The downtown area has a modest stock of distinctive historic buildings--both residential and mercantile, and a scale that reflects residents' explicit preference for maintaining small town character. There are also a number of opportunities for infill in the downtown area, including underutilized land, vacant lots, and parking lots. Given its central location, historic role, and pedestrian orientation, a new and important role--civic/public and commercial, should be explored for the area.
- The substantial corridor of industrial development along Route 99 is generally of low visual quality, and although it provides an important employment base, had an adverse impact on the overall quality of the city, particularly with respect to city entrances. Some portions are severely blighted and constitute serious visual liabilities in terms of the overall image of the city.
- Although the Tuolumne River borders the city along most of its northern boundary, the pattern of ownership and the depressed topography tend to minimize the aesthetic and recreational value of the river.
- The agricultural lands that border the city also constitute an important open space and scenic resource, and provide a visual container for the city in terms of visual screening or urban development. Expansion of the city threatens to convert these lands from agricultural to urban uses.
- The adjacency of Modesto and the proximity of Keyes and Hughson raise important questions about how to maintain a separate and distinctive identity for Ceres and an adequate separation from these other communities as urban growth continues in central Stanislaus County.

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CHAPTER 3

POPULATION



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CHAPTER 2

COLLOCATION

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CHAPTER 3 POPULATION



3.0 INTRODUCTION

If a city is to effectively establish land use patterns and set policies regarding housing and public facilities and services, it must first have a clear understanding of who lives in the community and how the population has changed and is expected to change in the future. This chapter reviews historical population trends, current demographics, and population projections for the city of Ceres, and summarizes population in the rest of the Study Area. Most of the information contained in this chapter is taken from the 1990 Census and the California Department of Finance. This chapter also cites studies conducted by Stanislaus County and the Stanislaus Area Association of Governments.

3.1 POPULATION

According to the U.S. Census, the Ceres had a 1990 population of 26,314 in incorporated territory. The total 1990 population of its sphere of influence was 34,708. The entire Study Area had a 1990 population of 46,438; approximately 9,800 persons in 1990 resided within the part of the Study Area in Modesto's sphere of influence.

3.2 HISTORICAL POPULATION GROWTH

3.2.1 POPULATION GROWTH IN CERES

As of January 1, 1993, Ceres had a population of 29,713, according to the California Department of Finance. Ceres' population doubled in the decade from 1980 to 1990, from a population of 13,281 in 1980 to 26,314 in 1990. Ceres experienced its highest growth rates of the decade during the late 1980s. The city's population increased by 36 percent during the two year period from 1988 to 1990, adding over 7,000 new residents. Table 3-1 and Figure 3-1 show the population and growth rates from 1980 to 1993 for Ceres, Stanislaus County, and California. As Table 3-1 and Figure 3-1 show, Ceres' 1988-90 growth rate greatly exceeded countywide and statewide growth rates. Since 1990, the city's growth rate has slowed, averaging less than five percent growth annually. Ceres' growth rate in the early 1990s, however, still exceeded countywide and statewide averages.

TABLE 3-1 POPULATION GROWTH RATES Ceres, Stanislaus County, and California 1980-1993

Year*	Ceres		Stanislaus County		California	
	Pop.	% Change	Pop.	% Change	Pop.	% Change
1980	13,281		265,900		23,668,145	
1981	14,250	0.07296137339	271,659	0.02165851824	24,038,711	0.01565691263
1982	14,888	0.04477192982	278,389	0.02477370527	24,546,566	0.02112634164
1983	16,238	0.09067705535	285,167	0.02434722636	25,075,581	0.02155169604
1984	16,557	0.01964527651	291,827	0.02335473600	25,578,254	0.02004619634
1985	17,234	0.04088904995	298,366	0.02240711106	26,112,632	0.02089196876
1986	17,764	0.03075316235	307,278	0.02986935509	26,741,621	0.02408757754
1987	18,572	0.04548525107	318,900	0.03782242790	27,388,477	0.02418888609
1988	19,313	0.03989877235	331,741	0.04026654124	28,060,746	0.02454573037
1989	22,969	0.18930254233	346,393	0.04416698569	28,771,207	0.02531864805
1990	26,314	0.14563106796	370,522	0.06965787415	29,760,021	0.03436839617
1991	27,539	0.04655316562	382,289	0.03175789832	30,321,416	0.01886389861
1992	28,407	0.03151893678	393,398	0.02905916728	30,989,009	0.02201711596
1993	29,713	0.04597458373	405,602	0.03102201841	31,551,554	0.01815321566

Sources: U.S. Bureau of the Census, 1980 and 1990; California Department of Finance, 1981-1989 and 1991-1993

3.1.2 REGIONAL POPULATION GROWTH

Ceres, along with other Stanislaus County communities, is at the center of the very large Central Valley, extending from Bakersfield in the south to Redding in the north. The Central Valley grew rapidly from 1980 to 1993. In 1993 there were 1.1 million people in the three-county area at the center of the valley (San Joaquin, Stanislaus, and Merced Counties). In the decade between the censuses, population in these counties increased by 372,000, or 50 percent, between 1980 and 1990, an average annual increase of nearly 29,000 persons per year and an annual growth rate of over three percent. Growth in the 1980s and early 1990s spread particularly south of Modesto along State Route 99, to Ceres and Turlock (which grew by 21,000 during these years) and to Atwater and Merced in Merced County.

At the center of the central three-county area is Modesto, which grew by 73,000 during these years, nearly as rapidly as much larger Stockton. Ceres was one of six smaller cities (Turlock, Lodi, Manteca, Tracy, and Merced were the others) that each grew by more than 16,000 residents during this same 13-year interval.

3.2 POPULATION CHARACTERISTICS

This section summarizes 1990 Census information on age, gender, and ethnicity for Ceres, Stanislaus County, and California.

3.2.1 AGE DISTRIBUTION

Age structure is a particularly important planning consideration because different age segments of the population require different kinds of services. A younger population will likely demand more opportunities for active recreation, whereas an older population will likely call for more passive recreational facilities. Different age groups also require different consideration when it comes to housing. An older population will generally have less need for the type of large housing units that a population with a large number of residents of child-bearing age will need. Table 3-2 shows the age distribution of Ceres' population in 1990, as compared to that of Stanislaus County and California.

Age Group	Ceres		Stanislaus County		California	
	Number	% of Total	Number	% of Total	Number	% of Total
Under 5	2,631	10.0%	33,734	9.1%	2,376,474	8.0%
5 to 17	6,055	23.0%	79,382	21.4%	5,363,005	18.0%
Subtotal, 0 to 17	8,686	33.0%	113,116	30.5%	7,739,479	26.0%
18 to 24	2,343	8.9%	35,704	9.6%	3,325,043	11.2%
25 to 34	5,172	19.7%	65,091	17.6%	5,739,293	19.3%
35 to 44	4,025	15.3%	54,017	14.6%	4,646,815	15.6%
45 to 54	2,194	8.3%	35,548	9.6%	2,955,981	9.9%
55 to 64	1,724	6.6%	26,793	7.2%	2,231,551	7.5%
Subtotal, 18 to 64	15,458	58.7%	217,153	58.6%	18,898,683	63.5%
65 to 69	824	3.1%	13,258	3.6%	1,055,906	3.5%
70 to 74	518	2.0%	10,488	2.8%	809,511	2.7%
75 and over	828	3.1%	16,507	4.5%	1,256,442	4.2%
Subtotal, 65 and over	2,170	8.2%	40,253	10.9%	3,121,859	10.5%
TOTAL	26,314	100.0%	370,522	100.0%	29,760,021	100.0%

Source: U.S. Bureau of the Census, 1990

Table 3-2 shows that in 1990, Ceres had a younger population than both the county and the state. Ceres had a slightly higher proportion of children under the age of 17 (33 percent) than Stanislaus County (30.5 percent), while both the county and the city had a higher proportion of children than reported statewide (26 percent). Both Ceres and Stanislaus County had a lower proportion of adults aged 18 to 64 (59 percent) than the state (64 percent). Ceres had a lower proportion of adults over 65 years (8 percent) than Stanislaus County and the state (both at 11 percent). Accordingly, the median age of Ceres residents was, at 27.7, lower than both Stanislaus County's (28.8) and California's (31.5).

Despite its population growth during the 1980s, Ceres' age distribution was essentially the same in 1990 as it was in 1980, when the median age was also 27.7.

This age distribution in 1990 for the entire General Plan Study Area was very similar to Ceres', with a slightly younger population residing in the part of the Study Area within Modesto's sphere of influence.

3.2.2 RACIAL AND ETHNIC COMPOSITION

Table 3-3 shows the breakdown of the ethnic subgroups of the population for Ceres, Stanislaus County, and California as of 1990.

TABLE 3-3 ETHNIC COMPOSITION Ceres, Stanislaus County, and California 1990						
Ethnic Group	Ceres		Stanislaus County		California	
	Total	% of Total	Total	% of Total	Total	% of Total
White	20,611	78.3%	297,925	80.4%	20,555,653	69.1%
Black	417	1.6%	6,039	1.6%	2,198,766	7.4%
American Indian/Eskimo/Aleut	300	1.1%	4,363	1.2%	248,929	0.8%
Asian/Pacific Islander	1,375	5.2%	18,856	5.1%	2,847,835	9.6%
Other	3,611	13.7%	43,339	11.7%	3,908,838	13.1%
Total	26,314	100.0%	370,522	100.0%	29,760,021	100.0%
Hispanic origin*	5,840	22.2%	80,041	21.6%	7,557,550	25.4%
* Persons of Hispanic origin are included under other ethnic categories (e.g., White, Other)						
Source: U.S. Bureau of the Census, 1990						

As Table 3-3 shows, the ethnic composition of Ceres and Stanislaus County was very similar, but both differed from the state in 1990. Most notably, Ceres and the county had fewer blacks and Asians than seen statewide, and a higher proportion of whites. About one-fifth of Ceres and Stanislaus County residents are Hispanic, a slightly lower proportion than the statewide average.

Ceres' ethnic composition changed somewhat between 1980 and 1990. Ceres had a lower proportion of whites in 1990 than reported in the 1980 Census, down from 88 percent in 1980 to 78 percent in 1990. The percentage of blacks residing in Ceres increased slightly, from 0.3 percent in 1980 to 1.6 percent in 1990. The percentage of Hispanics in Ceres nearly doubled between 1980 and 1990, from 13 percent to 22.2 percent.

The ethnic composition of the entire Study Area in 1990 as a whole differed in some respects from incorporated Ceres. The proportions of white and black ethnic categories were essentially the same. Incorporated Ceres had a slightly higher proportion of Asian/Pacific Islanders at 5.2 percent, compared to 4.1 percent for the entire Study Area, and 3.0 percent for the part of the Study Area in Modesto's sphere of influence. The Study Area outside Ceres' city limits had a higher proportion of Hispanics than incorporated Ceres at 22 percent. Hispanics represented 31.3 percent of the entire Study Area and 56.5 percent of the part of the Study Area in Modesto's sphere of influence.

3.2.3 HOUSEHOLD AND FAMILY COMPOSITION

Table 3-4 shows a breakdown of family composition according to the 1990 Census for Ceres. As the table indicates, Ceres and Stanislaus County had a much higher percentage of married couple families with children (38 percent and 32 percent, respectively) than did the state (26.5 percent). Ceres also had a higher percentage of female families with children than the state (7.7 percent in Ceres, as compared to 6.4 percent statewide). The percentage of single male families without children (1.3 percent), on the other hand, was lower than the statewide average (2.4 percent). Ceres had a lower proportion of non-family households (19 percent) than either Stanislaus County (24 percent) or the state (31 percent).

TABLE 3-4 FAMILY COMPOSITION Ceres, Stanislaus County, and California 1990						
Family Type	Ceres		Stanislaus County		California	
	Total	% of Total	Total	% of Total	Total	% of Total

Married Couple w/Children	3,293	38.0%	39,733	31.6%	2,752,645	26.5%
Married Couple w/o Children	2,336	26.9%	36,394	28.9%	2,850,982	27.4%
Single Male w/Children	208	2.4%	2,681	2.1%	200,612	1.9%
Single Male w/o Children	111	1.3%	2,275	1.8%	252,964	2.4%
Single Female w/Children	666	7.7%	8,733	6.8%	661,698	6.4%
Single Female w/o Children	404	4.7%	5,448	4.3%	499,976	4.8%
Non-Family Households	1,652	19.1%	30,467	24.2%	3,180,823	30.6%
Total	8,670	100.0%	125,731	100.0%	10,399,700	100.0%

Source: U.S. Bureau of the Census, 1990

Family composition in 1990 did not differ much from that reported in the 1980 Census. Ceres had roughly the same proportion of married couples, although the percentage of married couples with children was slightly higher in 1990 than in 1980 (35 percent in 1980 and 38 percent in 1990).

3.2.4 PLACE OF RESIDENCE

As would be expected with Ceres' rapid growth during the 1980s, the 1990 Census indicated that the many of Ceres' residents were relatively new. Just over one-third of Ceres' population (34 percent) had lived in the same home for at least five years in 1990. This was lower than both the countywide and statewide totals, both of which were more than 40 percent. In the last five years, a quarter of Ceres' 1990 population had moved from another county in California, compared to 19 percent countywide and 12 percent statewide. Very few (2 percent) of Ceres' residents had moved from another country. Table 3-5 shows the residential movement patterns of the local population between 1985 and 1990.

TABLE 3-5 RESIDENTIAL PATTERNS Ceres, Stanislaus County, and California 1985 to 1990

Place of Residence in 1985	Ceres		Stanislaus County		California	
	Total	% of Total	Total	% of Total	Total	% of Total
Same House	8,175	34.5%	140,708	41.8%	12,146,574	44.4%
Different House in Same County	7,777	32.8%	104,747	31.1%	8,525,870	31.1%
Different County in California	5,975	25.2%	63,543	18.9%	3,237,662	11.8%
Different State	1,392	5.9%	18,755	5.6%	1,974,833	7.2%
Different Country	364	1.5%	9,035	2.7%	1,498,608	5.5%
Total	23,683	100.0%	336,788	100.0%	27,383,547	100.0%

Source: U.S. Bureau of the Census, 1990

3.2.5 OTHER CHARACTERISTICS

Other population characteristics reported by the Census include income, labor force characteristics, housing values, and commuting travel patterns. These are summarized below.

Average family income in Ceres in 1990 was \$35,000, compared with \$37,000 for Stanislaus County and \$46,000 for the state. Ceres' per capita income was \$11,600 compared with \$12,730 countywide and \$16,400 statewide. Only 17 percent of Ceres' labor force described themselves as managers and professionals (in contrast to 21 percent countywide and 29 percent in the state), while a much higher percentage of Ceres' labor force (22 percent, compared with 18 percent in Stanislaus County and 13 percent statewide) was in production work (operators, fabricators, laborers). There were also slightly more people living below the poverty level in Ceres than countywide and statewide (15.5 percent in Ceres compared with 14.1 percent countywide and 12.5 percent statewide).

The average value of owner-occupied single family housing units in the community was, in 1989, \$130,000, compared \$135,000 for Stanislaus County and \$231,000 for the state. (Note that 1989 was the peak of the real estate market, so it may not be representative of current housing prices). The lower dwelling unit values in Ceres and Stanislaus County in part reflect the lower overall values of housing in the Central Valley compared with the more populous and expensive coastal areas, and they reflect the socioeconomic characteristics of the residents living in the community. Ceres is, in other words, a solidly blue-collar community without significant extremes of wealth or poverty. Ceres had a higher percentage of its residents living in owner-occupied dwelling units (61 percent) than Stanislaus County (58 percent).

or the state (52 percent), and the city's proportion of single family to multi-family units (71 percent single family, 18 percent multi-family) was slightly lower than Stanislaus County's (73 percent single family, 18 percent multi-family). Both were much higher than the statewide average of 62 percent single family and 35 percent multi-family. The census indicated that housing units in Ceres were, in general, in good shape.

Most of Ceres' residents drive to work (94 percent) and very few use public transportation (less than one percent). Average travel time to work was 26 minutes, almost identical to that of the state as a whole, and only slightly higher than Stanislaus County's 22-minute average travel time. According to the Census, 83 percent of Ceres' labor force worked outside the city of Ceres in 1990. For all of Stanislaus County, only 41 percent of the labor force worked outside its home city or community. Statewide, 55 percent of the labor force worked outside its home city or community in 1990.

3.3 POPULATION PROJECTIONS

Population projections form the basis for almost all planning activities. Community planning can, therefore, only be as effective as the ability of local officials to anticipate population growth. In the case of Ceres and Stanislaus County, population growth had historically been relatively predictable until the late 1980s. The sudden increase in growth rate in Stanislaus County communities was largely unanticipated. In response, the County and Stanislaus Association of Governments (SAAG) commissioned or prepared new population projections. The State Department of Finance (DOF) also recently published a revised set of countywide population projections.

In 1988, Stanislaus County contracted with Kreines & Kreines and QED Associates to evaluate potential countywide population and employment growth and its impacts. QED analyzed two growth scenarios to reflect the uncertainties of economic cycles, public policies, and commuting patterns. The two growth scenarios differ primarily in their assumptions about future increases in the number of Bay Area commuters versus the number of county-employed residents.

The lower growth scenario assumes that the number of commuters countywide will peak at 20,000 in the year 2000 and then remain constant. Between 2000 and 2010, this scenario projects that 80,000 new residents moving into Stanislaus County between 2000 and 2010 will find local employment.

The higher growth scenario forecasts that the number of Bay Area commuters will peak at 30,000 in the year 2000 and will then decline to 27,000 as some residents switch to jobs in the local economy. This scenario also forecasts that an additional 108,000 new residents will move into the county between 2000 and 2010 and find employment in the county's expanding economy. The higher growth scenario (Scenario B) became the basis for the County's *Economic Strategic Plan*. The *Economic Strategic Plan* assumed that much of the growth would take place (under a revised County land use policy) in "remote developments" away from prime farmlands, with access to state and federal interstate highways, and with more balanced housing and job development.

The California Department of Finance (DOF) periodically publishes countywide population projections. The most recent projections were published in April 1993, and projected that Stanislaus County's population will grow from 376,100 in 1990 to 517,600 in 2000 and 670,000 in 2010. These projections are similar to QED's projections but are slightly below QED's 2000 estimates and higher than QED's 2010 estimates.

In response to QED's and DOF's projections, the Stanislaus Area Association of Governments (SAAG) revised its population projections for Stanislaus County and its cities in 1993. Its countywide projections are generally consistent with the State Department of Finance's estimates for Stanislaus County, extrapolated to 2005 and 2015. Table 3-6 compares the countywide population projections prepared by QED for Stanislaus County, DOF, and SAAG.

TABLE 3-6 SUMMARY OF COUNTYWIDE POPULATION PROJECTIONS

Source	1990	2000	2005	2010	2015	2020
SAAG	370,522	--	549,400	--	709,100	--
DOF	376,100	517,600	--	670,000	--	840,200
QED	354,000	502,000	--	610,000	--	--

Sources: Stanislaus Area Association of Governments, 1993; California Department of Finance, 1993; *A Strategic Planning Approach for Change: Population and Economic Forecasts 1988-2010*, Kreines & Kreines and QED Research Inc., June 1988

SAAG allocated the countywide population growth projections to each of the county's cities and unincorporated areas. SAAG projects significant growth in Ceres and countywide from 1990 to 2015, as shown in Table 3-7. As Table 3-7 indicates, SAAG projects that Ceres will grow from a population of 26,314 by 1990 to 51,200 in 2005, nearly doubling its population in 15 years, and that the city will grow to 73,200 by 2015.

TABLE 3-7 POPULATION, STANISLAUS COUNTY & CITIES 1980, 1993, and Projected to 2005 and 2015

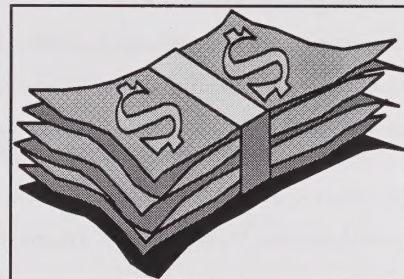
Jurisdiction	1980	1993	Change	Percent Change 1980-93	Percent of Total Change 1980-93	Percent of Total 1980	Percent of Total 1993	2005	2015	Change 1993/15	Percent Change 1993/15	Percent of Total Change 1993/15	Percent of Total 2015
Ceres	13,000	29,700	16,700	128.5%	11.8%	4.9%	7.3%	51,200	73,200	43,500	146.5%	14.3%	10.3%
Modesto	105,400	178,500	73,100	69.4%	51.7%	39.9%	44.0%	249,400	320,000	141,500	79.3%	46.6%	45.1%
Turlock	25,750	47,100	21,350	82.9%	15.1%	9.7%	11.6%	72,200	95,900	48,800	103.6%	16.1%	13.5%
Oakdale	8,400	13,600	5,200	61.9%	3.7%	3.2%	3.4%	19,100	24,500	10,900	80.1%	3.6%	3.5%
Riverbank	5,625	12,100	6,475	115.1%	4.6%	2.1%	3.0%	15,000	32,700	20,600	170.2%	6.8%	4.6%
Patterson	3,850	9,375	5,525	143.5%	3.9%	1.5%	2.3%	18,000	21,000	11,625	124.0%	3.8%	3.0%
Other Incorporated*	8,375	14,825	6,450	77.0%	4.6%	3.2%	3.7%	24,500	37,000	22,175	149.6%	7.3%	5.2%
Unincorporated	93,800	100,400	6,600	7.0%	4.7%	35.5%	24.8%	100,000	104,800	4,400	4.4%	1.4%	14.8%
Total County	264,200	405,600	141,400	53.5%	100.0%	100.0%	100.0%	549,400	709,100	303,500	74.8%	100.0%	100.0%
*Hughson, Newman, and Waterford													
Sources: California State Department of Finance; Stanislaus Area Association of Governments													

3.4 FINDINGS

- According to the U.S. Census, Ceres had a 1990 population of 26,314 in incorporated territory. The total 1990 population of its Sphere of Influence was 34,708. The entire Study Area had a 1990 population of 46,438; approximately 9,800 persons in 1990 resided within the part of the Study Area in Modesto's Sphere of Influence.
- Ceres' population doubled in the decade from 1980 to 1990, from a population of 13,281 in 1980 to 26,314 in 1990. Ceres experienced its highest growth rates of the decade during the late 1980s. The city's population increased by 36 percent during 1988 and 1989, adding over 7,000 new residents.
- In 1990, Ceres had a younger population than both the county and the state. Ceres had a slightly higher proportion of children under the age of 17 (33 percent) than Stanislaus County (30.5 percent). Both Ceres and Stanislaus County had a lower proportion of adults aged 18 to 64 (59 percent) than the state (64 percent). Ceres had a lower proportion of adults over 65 years (8 percent) than Stanislaus County and the state (both at 11 percent). The median age of Ceres residents was, at 27.7, lower than both Stanislaus County's (28.8) and California's (31.5).
- Ceres' ethnic composition changed somewhat between 1980 and 1990. Ceres had a lower proportion of whites in 1990 than reported in the 1980 Census, down from 88 percent in 1980 to 78 percent in 1990. The percentage of Hispanics in Ceres nearly doubled between 1980 and 1990, from 13 percent to 22.2 percent.
- Ceres and Stanislaus County had a much higher percentage of married couple families with children (38 percent and 32 percent, respectively) than did the state (26.5 percent). Ceres also had a higher percentage of female families with children than the state (7.7 percent in Ceres, as compared to 6.4 percent statewide).
- As would be expected with Ceres' rapid growth during the 1980s, the 1990 Census indicated that the many of Ceres' residents were relatively new. Only one-third of Ceres' population (34 percent) had lived in the same home for at least five years in 1990.
- Three sources of countywide population projections (Stanislaus County, California Department of Finance, and Stanislaus Area Association of Governments) estimate rapid population growth over the next 15 to 25 years. SAAG projects that Ceres will grow from a population of 26,314 by 1990 to 51,200 in 2005, nearly doubling its population in 15 years, and that the city will grow to 73,200 by 2015.

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FISCAL CONSIDERATIONS

INTRODUCTION

The purpose of this section is to provide information on the fiscal impact of the proposed population growth on the City of Ceres. The information is presented in a way that allows the reader to understand the fiscal impact of the proposed growth on the City of Ceres. The information is presented in a way that allows the reader to understand the fiscal impact of the proposed growth on the City of Ceres.

EXISTING FISCAL DATA AND TRENDS

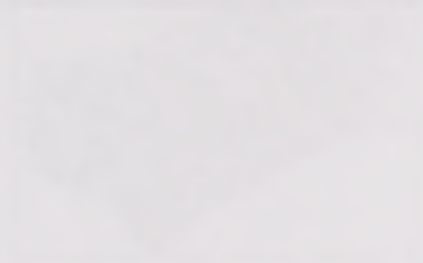
The existing fiscal data for the City of Ceres is presented in the following table. The table shows the fiscal data for the City of Ceres for the years 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.

The table shows the fiscal data for the City of Ceres for the years 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. The table shows the fiscal data for the City of Ceres for the years 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.

PROPOSED FISCAL DATA

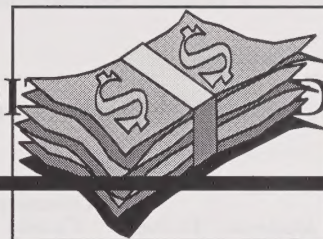
The proposed fiscal data for the City of Ceres is presented in the following table. The table shows the fiscal data for the City of Ceres for the years 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. The table shows the fiscal data for the City of Ceres for the years 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.

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CHAPTER 4 ECONOMIC CONDITIONS FISCAL CONSIDERATIONS



4.0 INTRODUCTION

Long-range city development plans must consider market factors and trends as well as fiscal capabilities of the city. This chapter reviews economic conditions and trends in Ceres, Stanislaus County, and the Central Valley. The chapter first reviews patterns of past growth in residential, industrial, and commercial investment and spending are examined and the outlook for the future is briefly discussed. The chapter then looks at the present fiscal status of the Ceres' city government to explore the potential of the community to capitalize on future opportunities, and describes the role of annexation in the city's current and future fiscal condition.

4.1 ECONOMIC CONDITIONS AND TRENDS

This section describes past growth trends in residential, commercial, and industrial development, and the prospects for future economic growth.

Chapter 3, *Population*, describes in detail the characteristics of Ceres' population and past growth. In summary, the 1990 Census described Ceres' residents as mainly white, moderate in income, with a high percentage of young married couples with children. Ceres residents generally live in owner-occupied single family housing units that are, by comparison with the state as a whole, moderately priced but in good condition. The educational attainment level of the city's population, taken as a whole, is fundamentally blue-collar.

4.1.1 RESIDENTIAL DEVELOPMENT

Ceres attracted a disproportionate share of the new investment in housing in the county over the last 15 years. Table 4-1 shows residential building permits in Ceres and the remainder of Stanislaus County between 1975 and 1993. During this period, 6,320 new permits were applied for in Ceres, an average of 335 per year, accounting for more than 10 percent of the countywide total. By comparison, over 31,000 new dwelling units were constructed in the city of Modesto (50 percent of the countywide total), 9,600 in Turlock (15.6 percent), 7,100 in the unincorporated area (13 percent) and 62,000 in the county as a whole during these years. New residential construction peaked in 1988 and 1989 in Ceres, when over 1,500 units were added to the city's housing stock during those two years. Total new construction, which averaged in the county 4,800 units during the peak years of 1985 and 1990, declined to an average of only 1,800 units per year between 1991 and 1993.

Of the housing units built in Ceres from 1975 to 1993, 79 percent were single family units. In 1986, 436 apartment units were constructed in the community, but there was comparatively little apartment construction before or after that year. Well over 90 percent of all housing built in Ceres between 1987 and 1993 were single-family units. This pattern reflected conditions in the county, which also attracted relatively few apartments (multi-family units accounted for only 25 percent of the total new housing units built between 1975 and 1993).

TABLE 4-1 RESIDENTIAL BUILDING PERMITS, STANISLAUS COUNTY Ceres, Modesto, Turlock, Unincorporated Stanislaus County, and Total County 1995-2012

Year	Ceres	Modesto	Turlock	Unincorp County	Total County	% Ceres	City of Ceres				Stanislaus County			
							SFDUs	MFDUs	Total DUs	SFDU % of Total	SFDUs	MFDUs	Total DUs	SFDU % of Total
1995	86	1,283	208	401	2,140	0.04018692	81	5	86.00000000	0.94186047	1,950	190	2,140.00000000	0.91112103
1996	188	2,362	569	546	3,862	0.04867944	159	29	188.00000000	0.84574468	2,910	952	3,862.00000000	0.77682315
1997	326	3,271	765	471	5,211	0.06255997	264	62	326.00000000	0.80981595	3,614	1,597	5,211.00000000	0.69466513
1998	556	1,665	1,070	373	4,058	0.13701331	299	257	556.00000000	0.53776978	2,158	1,900	4,058.00000000	0.53253081
1999	453	1,426	731	321	3,290	0.13768997	391	62	453.00000000	0.86313466	2,391	899	3,290.00000000	0.73556262
2000	217	1,371	259	274	2,314	0.093777701	211	6	217.00000000	0.97235023	1,452	862	2,314.00000000	0.62273121
2001	343	401	116	187	1,141	0.30061350	198	145	343.00000000	0.57725948	871	270	1,141.00000000	0.76345311
2002	56	611	119	147	1,021	0.05484819	56	0	56.00000000	1.00000000	670	351	1,021.00000000	0.65513212
2003	178	1,029	307	136	1,808	0.09845133	137	41	178.00000000	0.76966292	1,232	576	1,808.00000000	0.68031029
2004	117	1,734	294	176	2,789	0.04195052	101	16	117.00000000	0.86324786	1,502	1,287	2,789.00000000	0.53069233
2005	320	2,252	589	241	3,747	0.08540165	226	94	320.00000000	0.70625000	2,156	1,591	3,747.00000000	0.57382171
2006	540	3,266	919	481	5,763	0.09370120	104	436	540.00000000	0.19259259	4,020	1,743	5,763.00000000	0.69581815
2007	454	1,687	929	454	3,938	0.11528695	421	33	454.00000000	0.92731278	2,894	1,044	3,938.00000000	0.73844363
2008	801	2,769	489	801	5,007	0.15997603	772	29	801.00000000	0.96379526	4,385	622	5,007.00000000	0.88194547
2009	787	3,226	635	787	6,338	0.12417166	723	64	787.00000000	0.91867853	5,143	1,195	6,338.00000000	0.81494162
2010	393	1,508	752	393	3,955	0.09936789	347	46	393.00000000	0.88295165	3,464	491	3,955.00000000	0.87103413
2011	126	400	349	238	1,643	0.07668898	118	8	126.00000000	0.93650794	1,452	191	1,643.00000000	0.88375533
2012	234	477	236	305	2,179	0.10738871	234	0	234.00000000	1.00000000	2,107	72	2,179.00000000	0.96420831
2013*	145	329	320	386	1,692	0.08569740	145	0	145.00000000	1.00000000	1,624	68	1,692.00000000	0.91548463
2014	6,320	31,067	9,656	7,118	61,896		4,987	1,333	6,320	0.78908228	45,995	15,901	61,896	0.74338529
2015	332,631	1,635,105	508,210	374,631	3,257,684		262,473	70,157	332,631		2,420,789	836,894	3,257,684	
2016	579	26316	263	474	2105		684	74	474		73684	737	05263	
Total	10.2%	50.2%	15.6%	11.5%	100.0%		8.1%	2.2%	10.2%		74.3%	25.7%	100.0%	

* First 11 months only

SFDUs = Single family dwelling units MFDUs = Multi-family dwelling units

Security Pacific National Bank; Lord & Associates, Inc.

CHAPTER 4: ECONOMIC DEVELOPMENT

The first part of the chapter discusses the role of the state in economic development. It argues that the state plays a crucial role in creating a favorable environment for economic growth. This involves establishing a legal system, providing infrastructure, and ensuring macroeconomic stability.

4.1 THE STATE AND ECONOMIC DEVELOPMENT

In this section, we explore the various ways in which the state can influence economic development. One key area is the provision of public goods, such as infrastructure and education. Another important role is the regulation of markets to prevent monopolies and ensure fair competition. The state can also act as a catalyst for innovation by supporting research and development.

Furthermore, the state can play a role in the redistribution of income and wealth. Through progressive taxation and social welfare programs, it can help to reduce poverty and inequality. This is essential for sustainable economic growth, as a healthy and educated population is more productive. Finally, the state can engage in direct economic activity, such as state-owned enterprises, to provide essential services and promote development in strategic sectors.

4.2 THE STATE AND ECONOMIC DEVELOPMENT

This section continues the discussion of the state's role in economic development. It examines the challenges faced by developing countries in establishing an effective state. These include issues such as corruption, weak institutions, and limited resources. It also discusses the importance of international cooperation and aid in supporting economic development.

4.1.2 GROWTH FACTORS IN THE REGIONAL ECONOMY

The significant growth in Stanislaus County's population and housing has been fueled by two major influences: 1) a very rapid increase in the number of county residents who commute to work in other areas, particularly the San Francisco Bay Area, and 2) strength in the local economy.

Commuters to Jobs Outside Stanislaus County

During the late 1980s, Stanislaus County experienced a surge in housing and population growth from persons who moved to Stanislaus County because of lower housing costs and continued to work in the Bay Area. Historic Stanislaus County commuter patterns are shown in the bottom half of Table 4-2. In 1980, less than one percent of the county's resident work force traveled to the nine-county Bay Area to work. By 1990, that total had risen to seven percent. Total numbers increased from 1,000 to 10,300 during this ten-year interval, a 26 percent annual growth rate. Between 1980 and 1990, Bay Area commuters accounted for 21 percent of Stanislaus County's net increase of 44,000 working residents. The majority of these commuters were working in Alameda and Santa Clara Counties at the time of the 1990 Census (nearly 80 percent of the total), but some Stanislaus County residents were working as far away as San Mateo, San Francisco, Marin, and even Sonoma Counties. Ten percent of the county's net increase in working population commuted to jobs in San Joaquin County. In summary, one-third of the net increase worked outside Stanislaus County and two-thirds within the county.

The San Francisco Bay Area urban region vastly expanded in size over the past decade and Stanislaus County and other Central Valley counties have become part of it. The reasons are very simple. Bay Area job growth was enormous during the past decade, and more and more of it occurred further and further from the area's traditional core, the cities of San Francisco and Oakland. Total employment in the entire nine-counties of the Bay region increased by nearly 500,000 during the 1980s and Alameda and Contra Costa Counties together accounted for nearly 40 percent of that total. Much of the new employment emerged in the southern and eastern sections of those counties (San Ramon, Pleasanton, Livermore, and Fremont). As commuting patterns demonstrate, Stanislaus County is within a tolerable commute distance of those areas and housing growth in the county has accordingly increased there to accommodate growing numbers of commuters relocating for Stanislaus County's lower housing costs.

Growth in Local Economy

The two-thirds of population and housing growth in Ceres and Stanislaus County that was not attributable to Bay Area commuters was supported by robust growth in the local economy. Employment grew in Stanislaus County between 1983 and 1991 by 35,700, a 36 percent gain over this eight-year interval, or four percent annually. The largest increase was in service and retail jobs, including government (25,600), but industrial employment also showed strength. Manufacturing, for example, grew by 5,300 (see Table 4-2).

TABLE 4-2 EMPLOYMENT, STANISLAUS COUNTY 1983 and 1991 (In thousands)

	1,983	1,991	Change	% Change	% of Total 1983	% of Total 1991	Ratio to State 1983	Ratio to State 1991
Total Employment, Stanislaus County	98.2	133.9	35.7	36.4%	100.0%	100.0%	1.00	1.00
Agriculture	12.9	14.6	1.7	13.2%	13.1%	10.9%	3.23	3.66
Mining	0.1	0.0	(0.1)	-100.0%	0.1%	0.0%	0.22	0.00
Construction	4.4	6.7	2.3	52.3%	4.5%	5.0%	1.26	1.24
Manufacturing	18.8	24.1	5.3	28.2%	19.1%	18.0%	1.03	1.16
Durables	4.8	6.8	2.0	41.7%	4.9%	5.1%	0.39	0.51
Non-Durables	14.0	17.3	3.3	23.6%	14.3%	12.9%	2.40	2.34
Transportation & Public Utilities	4.1	4.9	0.8	19.5%	4.2%	3.7%	0.81	0.76
Wholesale Trade	3.9	5.7	1.8	46.2%	4.0%	4.3%	0.68	0.73
Retail Trade	17.7	25.2	7.5	42.4%	18.0%	18.8%	1.08	1.10
Finance, Insurance, & Real Estate	3.6	5.2	1.6	44.4%	3.7%	3.9%	0.58	0.62
Services	17.4	26.5	9.1	52.3%	17.7%	19.8%	0.78	0.74
Government	15.3	20.9	5.6	36.6%	15.6%	15.6%	0.93	0.95
Source: California State Department of Employment Department; Lord & Associates, Inc.								

The last two columns of Table 4-2 provide one means of measuring the Stanislaus County economy by comparing it with the state as a whole. These columns compare the ratio of employment in each category in the county to that found in the state of California in 1983 and 1991. A ratio of 1.00 indicates that the percentage of the county's labor force employed in any given industry is equivalent to the percentages found in the state as a whole. A coefficient below 1.00 indicates a lower percentage thus employed, and a number above 1.00 denotes heavier reliance on that category.

Table 4-2 shows that higher percentages of the county's labor force are employed in agriculture, construction, and non-durable goods manufacturing (mainly food processing) than in the state as a whole. This is to be expected in the Central Valley, with its enormous agricultural base, and with its high population growth (which provide opportunities for the construction industry, for example). On the other hand, a comparatively small percentage of the area's population is employed in durable goods manufacturing or in transportation, public utilities, finance, insurance and real estate, and in service industries (professional, personal, financial, governmental). The low ratio of services employment shows up in the noticeable lack of office development in Stanislaus County compared with other areas of the state. The county compares favorably in retail trade, but not in wholesale trade.

Table 4-2 shows little change over the structure of employment found in the county in 1983.

Future Outlook for Employment Growth

The pertinent question with respect to Ceres' outlook for employment growth is whether past trends will continue or whether other influences will alter these trends.

One changing trend that has become evident is the increasing resistance on the part of residents and companies throughout the state to long commutes and a desire on the part of state and federal agencies to reduce commuting in order to minimize the negative effects on transportation and air quality. For instance, the San Joaquin Valley Unified Air Pollution Control District adopted Rule 9001, which requires employers in the eight county air quality district to find ways to minimize work trips through ride sharing, car pooling, and other techniques. In addition, the state's 1990 Congestion Management Program, requires studies of the impact of any land use proposal on vehicular traffic.

At this point, however, it appears that State legislation will have only a mildly inhibiting effect on continued commuter growth in Stanislaus County. Curbing commuter growth would probably require much more severe land use controls in all California counties than are presently available. Alternatively, the state's long-term population growth would have to slow down or reverse itself, which is not likely.

The economy of Stanislaus County is likely to be changing in the next two decades. One change that is already evident in manufacturing is a growing interest in the area by packaging companies, particularly those selling paper and plastic products used in agriculture and the food processing industries. Other such spinoffs or satellite industries are likely. Another change will be big growth in the numbers of people providing professional, personal, financial, business, health, government and other services to the rapidly growing local population base.

A third change will be growing interest in the area on the part of high-technology firms as a location for its product assembly and other manufacturing requirements. This interest was beginning to be apparent near the end of the 1980s because of the low cost of housing and industrial land in the Central Valley relative to the coastal areas. The low demand for labor and ample supplies of vacant research and development space in the Bay Area during the recession years of 1991 to 1993 sharply slowed relocations to Stanislaus County. Interest in the county by high-tech industries can be expected to surface again as the economy recovers.

4.1.3 INDUSTRIAL INVESTMENT

As described in the last section, Stanislaus County experienced substantial growth in industrial development in recent years. Ceres, however, did not share in the rapid growth in manufacturing and other industrial employment in the county. As shown in Table 4-3, Ceres attracted only 3.6 percent of Stanislaus County's total industrial investment between 1975 and 1993. It attracted slightly more near the end of the 1980s, but most of the industrial investment in the county took place outside the city limits of Stanislaus County cities. The unincorporated areas attracted 71 percent of all industrial investment during these years, with much of it going into the Beard industrial area, which is in the unincorporated area adjacent to South Modesto.

Total yearly new industrial investment in Stanislaus County peaked in 1986 at \$97 million, well over the \$27 million average for the 19-year period. It peaked in Ceres in 1990 at \$4 million, compared with an average of \$980,000 during the years 1975 to 1993. Stanislaus County's experience with industrial investment parallels that of California as a whole (indeed with the nation), where total investment peaked in 1986 and dropped continuously in the following seven years.

The investment levels shown in Table 4-3 should be reviewed with the following qualifications. They are consistently understated, by at least one-half, for several reasons. These data reflect only the cost of new construction, which is usually understated, and they do not include such items as land costs and so called "soft" costs, such as for financing, architectural and engineering services, and developer's profit. These figures do not reflect the implications of inflation as they are reported in nominal dollars, which means the 1980 totals would, to provide a consistent measure with 1993 investment levels, have to be elevated by at least a four to five percent inflation factor. The data in Table 4-3 does, however, provide a solid indication of where industrial and commercial investment was taking place in the county and at least an understanding of the order of magnitude of such new investment.

The U.S. Department of Commerce reports 33 companies in Stanislaus County with over 250 employees. The major employers in the area are the large agricultural corporations, including Gallo, Foster Farms, Del Monte, S & W, Campbell Soup, Kraft General Foods, Frito Lay, and Patterson Frozen Foods, and the California Almond Growers Exchange and the Tri-Valley Growers (both of which are farmer's cooperatives). These companies and others like them are both growers and food processors (manufacturers), and their operations are typically distributed widely throughout the county. At least one-third of the employment in most of these companies is seasonal (particularly during harvest time) and they make substantial use of farm labor contracting firms to provide that temporary labor. The principal agricultural products from the county are milk, almonds, chickens, walnuts, cattle, grapes, tomatoes, peaches, turkeys, and apples and other fruit and vegetables. This is one of the reasons why so much industrial investment in the county takes place outside the cities and why commuting times are so long for such a comparatively small region.

Other major employers are the public utilities (such as the Turlock Irrigation District), Pacific Bell, the two major hospitals in Modesto (Doctors Medical Center and Memorial Hospital), Modesto city schools, the Modesto Community College, Modesto city government, and Stanislaus County government.

TABLE 4-3 VALUE OF COMMERCIAL AND INDUSTRIAL INVESTMENT STANISLAUS COUNTY, 1975 TO 1993 (In Thousands of Dollars)

Year	COMMERCIAL INVESTMENT						INDUSTRIAL INVESTMENT					
	Ceres	Modesto	Unincorp.	Total County	% Ceres	% Modesto	Ceres	Modesto	Unincorp.	Total County	% Ceres	% Uninc.
1975	1,742	15,875	2,866	22,585	7.7%	70.3%	316	4,287	3,925	10,403	3.0%	37.7%
1976	380	25,248	7,123	36,245	1.0%	69.7%	131	284	8,713	10,432	1.3%	83.5%
1977	243	17,263	5,700	26,046	0.9%	66.3%	206	180	6,489	9,266	2.2%	70.0%
1978	1,063	21,391	9,599	36,993	2.9%	57.8%	1,060	3,247	4,263	13,701	7.7%	31.1%
1979	3,553	22,989	17,066	48,776	7.3%	47.1%	20	0	13,314	17,224	0.1%	77.3%
1980	1,527	22,765	13,838	47,797	3.2%	47.6%	0	334	19,884	24,097	0.0%	82.5%
1981	665	11,553	6,763	24,951	2.7%	46.3%	325	839	10,049	13,336	2.4%	75.4%
1982	3,124	8,592	7,597	20,684	15.1%	41.5%	0	1,550	9,254	12,767	0.0%	72.5%
1983	530	13,533	5,114	21,479	2.5%	63.0%	300	1,824	2,568	7,201	4.2%	35.7%
1984	3,855	9,196	7,857	21,879	17.6%	42.0%	464	215	1,812	6,578	7.1%	27.5%
1985	982	15,143	12,322	42,146	2.3%	35.9%	978	2,048	4,113	17,826	5.5%	23.1%
1986	181	25,806	31,175	59,362	0.3%	43.5%	1,969	1,182	87,619	97,655	2.0%	89.7%
1987	474	17,549	23,643	50,302	0.9%	34.9%	378	167	47,625	56,197	0.7%	84.7%
1988	1,323	17,935	12,146	41,381	3.2%	43.3%	1,490	916	27,104	32,564	4.6%	83.2%
1989	1,833	40,787	15,292	62,834	2.9%	64.9%	844	3,252	3,019	10,290	8.2%	29.3%
1990	4,913	22,499	6,191	50,062	9.8%	44.9%	4,098	4,621	14,537	24,134	17.0%	60.2%
1991	529	21,980	8,158	33,816	1.6%	65.0%	1,166	4,470	15,310	22,185	5.3%	69.0%
1992	5,099	15,422	7,706	34,836	14.6%	44.3%	960	2,731	6,030	13,353	7.2%	45.2%
1993*	1,915	8,502	5,580	18,036	10.6%	47.1%	0	2,213	2,378	5,671	0.0%	41.9%
Total	33,931	354,028	205,736	700,210			14,705	34,360	288,006	404,880		
Average	2,262	23,602	13,716	46,681			980	2,291	19,200	26,992		
Percent	4.8%	50.6%	29.4%	100.0%			3.6%	8.5%	71.1%	100.0%		

* First 11 months only

Source: Security Pacific National Bank, California Construction Trends; Lord & Associates, Inc.

4.1.4 COMMERCIAL INVESTMENT

Ceres did not capture a proportional share of Stanislaus County's commercial investment between 1975 and 1993, with the city attracting only 4.8 percent of the county total over the 19-year period. The majority of commercial investment during these years was directed to Modesto (50 percent of the total), while the unincorporated areas attracted 29 percent, a surprisingly high percentage for unincorporated areas. Stanislaus County's unincorporated areas had 25 percent of the county's total population, but 20 percent of its retail sales. This is a remarkably high number for unincorporated areas, and is not generally found in California. Generally, there are a number of reasons why commercial investment, mainly in the form of shopping centers and free standing commercial buildings, tends to concentrate in incorporated communities. They have a larger immediate population base and, therefore, provide adequate nearby support for new stores. Infrastructure and municipal services are also available. Rural areas typically have neither adequate nearby markets for retailers nor appropriate infrastructure.

As shown in Table 4-3, commercial investment in the county as a whole was somewhat more consistent from year-to-year than industrial investment. It peaked at \$63 million in 1989 but averaged \$51 million between 1985 and 1990. It dropped to an average of \$29 million between 1991 and 1993, but this was still a very healthy level of investment in light of the slow economic conditions statewide. In the city of Ceres, commercial investment was considerably less consistent. Ceres attracted substantial outlays during only 5 random years of the past 19, (but over \$5 million in 1992). In 1992 it attracted Wal-Mart and Walgreen's Drugs. Wal-Mart's satellite, Sam's Club, and Smith's, the grocery chain, also announced plans to build stores in the area; these stores have not yet been built (as of May 1994).

The limited amount of commercial investment in Ceres prior to 1992 shows up particularly in the retail sales statistics. In 1992, Ceres had retail sales of \$135 million, only 5.8 percent of the county's total of \$2.3 billion. In per capita terms, it accounted for total retail sales of \$4,532, well below (79 percent) of average per capita retail sales for the county as a whole. The greatest share of retail sales in the county was in Modesto (\$1.3 billion, or 57 percent of the county's total retail sales). Moreover, Modesto's per capita sales were \$7,411. Since most retailing takes place in incorporated areas, Modesto's per capita figure is a better measure of the extent to which Ceres has lagged behind in retail sales growth in the past. Ceres' per capita retail sales were 61 percent of Modesto's.

Ceres does well in convenience goods, including food, drug and liquor store sales (\$1,281 per capita in 1992, compared with \$862 for the county as a whole). It is reasonably well represented in restaurant sales (\$649 compared with \$594). It is well below (at \$1,373) the \$2,053 in per capita comparison goods sales in the county as a whole (these include apparel, general merchandise and specialty goods stores and home furnishings stores). It is well below (36 percent) Modesto's \$3,800 in per capita comparison goods store sales. Ceres' highway-oriented retail sales (autos, boats, building materials, farm implements and materials, and service stations) are, at \$1,228, only 56 percent of the per capita sales found in Stanislaus County as a whole. For the most part, the county's auto dealers are located in the unincorporated area on McHenry, north of Modesto, and in Oakdale. The farm implement stores are in the unincorporated areas and the general merchandise stores are in Modesto shopping centers.

Despite its low share of the total, Ceres retail sales have been growing more rapidly than most of the other communities and the unincorporated areas of Stanislaus County. Its total retail sales have grown by 165 percent since 1980, compared with 129 percent in Modesto and 100 percent for the unincorporated areas.

4.1.5 OUTLOOK FOR FUTURE ECONOMIC GROWTH

Despite the depth of the economic slowdown and the major disasters in California during the first three years of the 1990s, the outlook for Stanislaus County in general and for Ceres in particular must be viewed as very promising. The population in California grew by an average of over 700,000 annually in the 1980s, but still managed to grow by a total of two million during the very slow economy found in the state between 1990 to 1993. The state's population grew by 570,000 in 1993, despite a decline in employment in the state of over 500,000 during these same years.

The California Department of Finance projects population in Stanislaus County to reach 625,000 by the year 2010, a 219,000, or 54 percent, gain over 1993. Total employment in the county should increase by at least 65,000 during these same years. Total retail sales in the county, which were \$2.3 billion in 1992, will reach, if the State's population projections prove out, \$4.7 billion in real or non-inflationary terms by 2010, an increase of over 100 percent. The opportunities in the region are apparent.

Ceres has ample land area in which to expand within its sphere of influence, and it has a comparatively new and trouble free infrastructure. In order to take advantage of potential growth, the City of Ceres will need to make some public investments, including upgrading existing areas and creating opportunities for industrial, commercial, and residential developers to invest successfully. Such decisions are the subject of future analyses but it is sufficient to point out that the potentials for the community are very promising.

4.2 FISCAL CONSIDERATIONS

This section discusses fiscal considerations for future growth in Ceres, including a comparative analysis of Ceres' current and future fiscal status and a discussion of the ramifications of future annexations.

4.2.1 CERES' FISCAL STATUS

As a result of a successful effort to increase its revenue base and cover operating deficits that for four years prior to 1994 drained the City's financial reserves during a period of very slow economic growth, the City of Ceres' fiscal condition has improved. Table 4-4 compares income and expenditures in Ceres' city government with nine comparable cities throughout the state during fiscal 1991-92. (These are cities with approximately 30,000 population, with similar household incomes of roughly \$45,000 in 1993, and a similar population growth rate of around four percent.) Seven of those cities are in the San Joaquin and Sacramento Valley areas (Ceres, Delano, Madera, Hanford, Yuba City, Porterville, and Folsom). In column 11, operating expenditures and income sources for the seven Valley communities are averaged. In the last column, Ceres is compared to this seven-city average.

As Table 4-4 shows, Ceres collects less and expends less than the other cities in nearly every category. Operating expenditures were only 65 percent of the seven-city average, while total income was 58 percent. Ceres came closest to the seven-city average in operating expenditures for public safety and public works, and even in these departments it was under 80 percent of the seven-city

average. It was substantially lower than the other cities in the two key revenue categories of taxes and current service charges (67 percent and 47 percent, respectively).

In per capita terms, the City does not fare much better. Its total revenues were 71 percent of the seven-city average in 1991-92 and its income from all sources was 64 percent of the total. It was particularly low in current service charges that year, 53 percent of the seven-city average.

TABLE 4-4 REVENUES AND COSTS, TEN CALIFORNIA CITIES WITH CHARACTERISTICS SIMILAR TO CERES Fiscal Year 1991-92, In Thousands of Dollars

City:	Ceres	Imperial Beach	Delano	Madera	Martinez	Hanford	Yuba City	Porterville	Gilroy	Folsom	Seven Valley Cities (Avg.)	Ceres % of 7 Valley Cities Avg.
County:	Stanislaus	San Diego	Kern	Madera	Contra Costa	Kings	Sutter	Tulare	Santa Clara	Sacramento		
Population, Jan. 1992	28,407	27,138	24,772	31,740	32,418	33,327	30,277	31,700	31,900	36,507	25,975	7.7%
Population Growth Rate	3.8%	2.4%	3.6%	3.9%	7.9%	4.0%	4.3%	4.1%	2.0%	5.5%	0	n/a
Revenues:												
Functional Revenues	5,634	7,954	11,160	10,582	9,261	9,683	9,952	13,087	17,352	12,776	9,337	0.0%
General Revenues	5,441	4,132	3,904	6,956	9,261	8,207	10,824	7,874	10,977	16,841	6,758	0.0%
Total	11,075	12,086	15,064	17,538	18,522	17,890	20,776	20,961	28,329	29,617	16,095	0
Expenditures:												
Operating Expenditures	10,204	10,176	15,405	14,809	17,600	12,723	16,094	17,870	19,338	23,083	13,048	0.0%
Capital Outlays	324	1,220	0	1,788	3,200	5,669	2,749	4,901	2,473	8,033	2,187	0.0%
Total	10,528	11,396	15,405	16,597	20,800	18,392	18,843	22,771	21,811	31,116	15,235	0
Functional Revenues	0	0	0	0	0	0	0	0	0	0	0	0
Net Expenditures	324	1,220	0	1,788	3,200	5,669	2,749	4,901	2,473	8,033	2,187	0
Operating Expenditures:												
General Government	593	961	735	1,105	1,125	480	1,445	1,505	1,423	2,248	881	0.0%
Public Safety	4,782	4,092	9,884	4,584	5,396	4,692	6,508	5,223	6,836	7,469	5,344	0.0%
Transportation	773	922	1,127	1,624	1,174	1,246	1,107	1,502	1,832	2,565	1,058	0.0%
Community Development	765	513	1,008	1,609	1,814	1,081	1,239	958	1,038	3,332	956	0.0%
Health	1,293	3,055	1,465	2,220	0	3,030	2,409	4,100	3,623	2,657	1,940	0.0%
Culture and Leisure	731	631	271	2,528	3,322	991	1,158	1,709	1,237	2,193	1,087	0.0%
Public Utilities	1,257	0	907	1,138	4,768	1,206	2,115	2,876	1,869	1,520	1,552	0.0%
Other	0	0	5	0	0	0	0	0	479	1,083	69	0.0%
Total	10,194	10,174	15,402	14,808	17,599	12,726	15,981	17,873	18,337	23,067	12,888	0.0%
Income Sources:												
Taxes	4,750	3,527	3,331	5,626	7,855	6,475	8,253	6,961	10,954	14,440	5,771	0.0%
Special Bond Assessments	68	216	3,640	24	0	26	24	11	175	0	583	0.0%
Licenses and Permits	291	273	222	331	280	397	318	267	245	1,338	248	0.0%
Fines and Forfeitures	169	105	179	85	114	142	149	90	119	81	115	0.0%
Rev. from Money/Property	777	306	123	627	812	848	1,936	2,567	2,504	2,690	933	0.0%
Intergovernmental	1,644	2,319	5,990	4,007	1,990	2,544	1,725	2,567	2,504	2,044	2,439	0.0%
Current Service Charges	2,603	9,642	1,316	6,194	6,011	6,468	7,576	8,014	11,798	6,544	6,116	0
Other Revenues	773	65	263	643	1,460	990	795	484	30	1,131	515	0.0%
Other Financing Sources	0	0	0	0	0	0	0	0	0	1,349	0	??
Total	11,075	16,453	15,064	17,537	18,522	17,890	20,776	20,961	28,329	29,617	16,719	0.0%

Source: California State Controller's Office, Financial Transactions Concerning California Cities, Annual Report, 1991-92; Lord & Associates, Inc.

The City has been able to operate effectively in the past with comparatively low operating expenditure levels because it is a relatively young community, with new infrastructure that does not require constant repair and replacement. It is also a comparatively quiet city, with low levels of crime, compared with some of the other Valley communities included in Table 4-4. Furthermore, Ceres' city government has a reputation for efficiency. In a 1992 study of over 13,000 cities by an Austin, Texas, research company, Ceres ranked in the top ten percent in the effective use of fiscal resources. Ceres has few of the obvious problems found in many other communities in its general size range in the state.

During the late 1980s and early 1990s, the City began experiencing operating deficits, indicating that the City's revenue structure was inadequate. These deficits depleted the City's reserves by some \$3.2 million. Since taxes and current service charges accounted for two-thirds of the total revenues to City government, the City decided to pursue a strategy to improve its fiscal status by concentrating on generating more income from those two key income sources. The City has attempted to increase sales tax revenues by encouraging more retailing in the community and by stemming sales leakage. In addition, the City imposed a five-percent users tax on utilities (electric power, natural gas, telephone service and cable television).

As mentioned above, Ceres' per capital retail sales were 79 percent of the countywide average. Its retail sales taxes were, in 1991-92, \$1.8 million, only 67 percent of those found in the seven cities in Table 4-4. Its water and sewer taxes were only 59 percent of the seven-city average that year. Since that period it has been successful in attracting considerably more retail investment (e.g., Wal-Mart, Walgreens Drugs, Sam's Club, and Smith Foods); when these stores become fully operational, they should boost the City's sales tax revenues by \$500,000 in fiscal 1994-95. In addition, the City's utility tax is expected to result in revenues of over \$975,000. These sources are expected to help boost total revenue to City government to a projected \$14.1 million in 1994-95, an increase of roughly 29 percent from 1991-92. These changes may or may not be enough to meet future needs and opportunities in the community. A balanced budget was achieved in 1993-94 (i.e., no outflow of reserves).

Whether revenues will be sufficient in Ceres in the future is a function of the City's expectations regarding investment in local economic growth and the quality and level of municipal services delivered to its residents.

4.2.2 ANNEXATION CONSIDERATIONS

Future expansion of Ceres will largely occur by annexing areas outside the current city limits. Chapter 1, *Land Use*, describes the general annexation process. While annexation generally will have no effect on the amount each property owner pays in property taxes, the distribution of the tax dollars to the City and County does change. All annexations to the city are also subject to inclusion in City special benefit assessment districts. If annexed parcels are in assessment districts, additional charges will be levied on the property to pay the cost of the special services provided the property. Annexation will have no effect on the assessed valuation of the property.

After annexation, the City begins to receive a portion of the one percent property tax levied on the parcel that was previously received by the County. This new revenue comes primarily from a reduction in the County's General Fund allocation from the area. In January 1996, the City entered into a tax-sharing agreement with Stanislaus County that specifies how property tax revenues generated in newly-annexed areas will be distributed between the City and the County. The agreement includes the following provisions:

- X For annexations other than County unincorporated islands, the County shall retain the property tax revenue from the base assessed valuation for the area to be annexed. After annexation, the City shall receive a 30 percent share of the County's property tax share attributable to an increase in assessed value above the base amount. The County shall continue to receive 100 percent of the property tax revenue attributable to the base assessed valuation.
- X The City shall receive the entire percentage amount of property tax of any affected special districts in the area annexed. However, no transfer of that percentage amount of property tax will occur until either the annexed territory is detached from the special district or the special district is dissolved.
- X For annexations affecting an unincorporated island, the City shall receive 34 percent of the County's share of property tax, including the base amount.

The issue of tax sharing became very relevant as a result of the demands by the counties and the fiscal problems of the state during the recession years, 1991 through 1993. The State reduced the amount of property taxes distributed to California schools by 20 percent, and in the process forced the counties to redirect some of the property taxes to the schools that had formerly been distributed to the cities. California cities lost approximately 15 percent of their total property tax income during these years (the actual amounts lost varied from city to city), and those funds are not likely to soon return to the cities, if ever.

The redirection of property taxes to schools represented a loss of \$150,000 in income to the City of Ceres in fiscal 1992-93, and \$375,000 in 1993-94 (with a one-time rebate of \$75,000 from the state making up part of that reduction). These reductions, although small in terms of total municipal income, have still been important losses, particularly because they directly impact cities' general funds. More importantly, they raise some serious questions regarding the advisability of future growth for cities where annexation is necessary. If the cities receive roughly 15 percent less in property taxes than before, annexations begin to look less attractive. Residential development is viewed as particularly disadvantageous, with the costs of services provided by the municipalities generally outpacing revenues.

While the cities have felt the pinch created by the state's property tax shifts, long-term impacts may be overstated. An important part of the recent decline in property tax revenues received by the cities has been the result of the severity of the economic recession in California. The annual rate at which the assessed value of real property has grown dropped in Stanislaus County to only five percent in 1992-93 after routinely growing at eight to nine percent in the 1980s. With the kind of growth anticipated for Stanislaus County, it is probable that assessed valuations will again begin to increase. It is difficult, however, to anticipate future levels even in the near term. Under current law, the state will take five percent of any gain in property tax revenues each year, but if assessed values again outstrip that five percent imposition, the burden on cities may ease somewhat. Nonetheless, relations between cities and counties remain strained because of the fiscal implications of new growth.

4.3 FINDINGS

- From 1980 to 1993, Ceres experienced a disproportionate share of countywide housing development. Residential building activity peaked in Ceres in 1988 and 1989. Housing development in Ceres, and in Stanislaus County as a whole, is predominantly single family homes.
- The significant growth in Stanislaus County's population and housing has been fueled by two major influences: 1) a very rapid increase in the number of county residents who commute to work in other areas, particularly the San Francisco Bay Area, and 2) employment generated by the local economy.
- One-third of the increase in employed residents in Stanislaus County between 1980 and 1990 commute outside the county, primarily to the San Francisco Bay Area.
- Employment in Stanislaus County grew by 35,700 between 1983 and 1991, a 36 percent gain over this eight-year interval, or four percent annually. The largest increase was in service and retail jobs, including government, but industrial employment also showed strength.
- Despite efforts by state and regional agencies to reduce long-distance commuting, this trend is likely to continue into the future. Stanislaus County's economy, however, is likely to experience other changes in the next two decades, including growth in packaging companies, growth in the numbers of people providing professional, personal, financial, business, health, government and other services, and growing interest in the area on the part of high-technology firms as a location for its product assembly and other manufacturing requirements.
- Stanislaus County experienced substantial growth in industrial development in recent years but Ceres did not share in it. Ceres attracted only 3.6 percent of Stanislaus County's total industrial investment between 1975 and 1993. It attracted slightly more near the end of the decade of the 1980s, but most of the industrial investment in the county took place outside the city limits of Stanislaus County cities.
- Ceres also did not capture its share of commercial investment since 1975. Ceres attracted only 4.8 percent of the county's total from 1975 to 1993. The majority of commercial investment during these years was directed to Modesto (50 percent of the total), while the unincorporated areas attracted 29 percent, a surprisingly high percentage for unincorporated areas.
- In a comparison of revenues and operating expenditures with other cities of its size with similar characteristics, Ceres had substantially lower revenues and operating expenditures. Operating expenditures were only 65 percent of the seven-city average; total income was 58 percent. Ceres was substantially lower than the other cities in the two key revenue categories of taxes and current service charges (67 percent and 47 percent respectively).
- Future growth in Ceres will occur largely as the result of annexations, whereby Ceres will receive a share of the property taxes for the annexed area. In January 1996, the City entered into a tax-sharing agreement with Stanislaus County that specifies how property tax revenues generated in newly-annexed areas will be distributed between the City and the County.

4.4 PERSONS CONSULTED

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Speck, Charlene, Stanislaus County Economic Development Commission

Weinland, Greg, California Local Government Fiscal Affairs

Woods, Charlie, Director of Planning and Community Development, City of Ceres

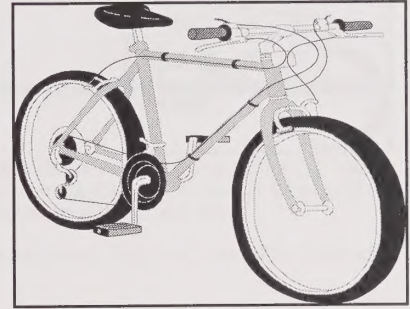
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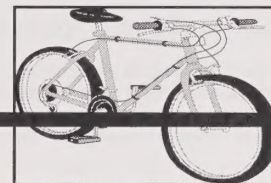
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TRANS

CHAPTER 5 TRANSPORTATION



5.0 INTRODUCTION

This chapter describes the transportation system and services. The discussion includes the street and roadway system, parking, transit services and facilities, bicycle facilities, pedestrian facilities, rail facilities, and air transportation. It serves to provide a general understanding of the importance of each of these modes and their part in the circulation system for the city.

The information in this chapter comes primarily from the City of Ceres Public Works Department, City of Ceres 1991 *Circulation Element*, and other recent studies.

5.1 STREET AND ROADWAY SYSTEM

5.1.1 EXISTING ROADWAY SYSTEM

The roadway system in Ceres is dominated by a north-south/east-west street grid and State Route 99. The existing street system in Ceres can be categorized by facility type, which range from freeway to four-lane arterials to two-lane local streets depending upon the function of the roadway.

The main north-south arterials include Crows Landing Road, South 9th Street, and Mitchell Road. Hatch Road and Whitmore Avenue are the main east-west arterials. Other arterials include Central Avenue, Service Road, and Faith Home Road. Major collectors are Morgan Road, Richland Avenue, Herndon Road north of Hatch Road, and Moffet Road. Minor collectors include South 7th Street, Blaker Road, and Roeding Road. Frontage roads are Herndon Road from Hatch Road to Whitmore Avenue, El Camino from Whitmore Avenue to Service Road, and Railroad Avenue from Whitmore Avenue to Collins Road.

State Route 99 runs through Ceres in a northwest/southeasterly direction bisecting the city. It links Ceres with the other major cities in the San Joaquin Valley from Stockton, Manteca, and Modesto to the north to Turlock, Merced, and Madera to the south. This highway operates as a six-lane freeway facility through most of the Study Area. At the southern end of the Study Area between Mitchell Road and Keyes Road, the four-lane section of State Route 99 is being widened to six lanes. The construction is scheduled to be completed in Fall 1994.

State Route 99 and Interstate 5 are the major north-south travel routes in the state providing access to the San Joaquin Valley, which is a prime agricultural region in the country. As a result, about 20 percent of the travel on Route 99 is truck traffic.

5.1.2 EXISTING SERVICE LEVEL CONDITIONS

The City's policy has been to maintain a minimum Level of Service (LOS) "D" on major roadways and LOS "C" on minor streets. According to the Regional Transportation Plan, the level of service standards for Stanislaus County are LOS D for all primary collectors, arterials, expressways, and freeways and LOS C for all streets and intersection with the designation of secondary collector or local streets. The City's policy is therefore consistent with county policy.

Level of service on urban streets is based on a segment's volume to capacity (V/C) ratio. The V/C ratio is in turn related to service level according to Table 5-1.

TABLE 5-1 DEFINITIONS OF LEVEL OF SERVICE IN URBAN AREAS

Level	Extent of Delay	Operating Characteristics	V/C Ratio
A	Less than 5.0 sec per vehicle	This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 0.60
B	5.1 to 15.0 sec per vehicle	This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	0.61-0.70
C	15.1 to 25.0 sec per vehicle	These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	0.71-0.80
D	25.1 to 40.0 sec per vehicle	At level "D", the influence of congestion becomes more noticeable. Long delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	0.81-0.90
E	40.1 to 60.0 sec per vehicle	This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	0.91-1.00
F	In excess of 60.0 seconds per vehicle	This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	> 1.00

Source: Highway Capacity Manual, Transportation Research Board, Special Report No. 209, 1985.

The V/C ratio is determined by comparing the existing volumes to the theoretical capacities, which are based upon the facility type of the roadway. Capacities have been developed on the basis of the Dowling Associates and may differ slightly from the *Traffic Impact Analysis* prepared in 1991 by Omni-Means in connection with the 1991 *Circulation Element*. Table 5-2 shows the results of the level of service analysis. The street and road segments that do not meet the City's standards are highlighted in grey.

TABLE 5-21993 LEVEL OF SERVICE SUMMARY^a

Location	Lanes	Facility Type	1993 ADT	PM Peak Hour	Capacity (veh/hr)	V/C	LOS
State Route 99b							
n/o Crows Landing	6	Freeway	88,000	7,700	10,800	0.71	C
s/o Hatch Road	6	Freeway	78,000	6,900	10,800	0.64	B
s/o Mitchell Road	4	Freeway	72,000	6,300	7,200	0.88	D
North-South Streets							
Mitchell Road							
n/o Hatch Rd	4	Expressway	46,335	3,339	3,800	0.88	D
s/o Hatch Rd	4	Arterial	28,576	2,058	3,000	0.69	B
n/o Whitmore Ave	4	Arterial	27,616	2,001	3,000	0.67	B
n/o Roeding Ave	4	Arterial	24,814	1,818	3,000	0.61	B
n/o Service Rd	4	Arterial	23,514	1,714	3,000	0.57	A
s/o Service Rd	4	Arterial	21,686	1,530	3,000	0.51	A
South 9th Street n/o Riverc,d	4	Arterial	30,650	3,065	3,500	0.88	D
Crows Landing Roadc							
n/o SR 99 NB ramps	2	Arterial	9,360	936	1,500	0.62	B
n/o Pecos Road	4	Arterial	15,830	1,583	3,000	0.53	A
n/o Whitmore Ave	4	Arterial	15,610	1,561	3,000	0.52	A
n/o Grayson	2	Arterial	9,080	908	1,500	0.61	B
Central Ave							
s/o River Rd	2	Arterial	2,468	263	1,500	0.18	A
n/o Hatch Rd	2	Arterial	3,521	353	1,500	0.24	A
s/o Hatch Rd	2	Arterial	7,382	694	1,500	0.46	A
s/o Evans Way	2	Arterial	8,139	650	1,500	0.43	A
n/o Whitmore Ave	2	Arterial	7,548	613	1,500	0.41	A
s/o Whitmore Ave	2	Arterial	3,913	369	1,500	0.25	A
s/o Hackett Ave	2	Arterial	3,927	381	1,500	0.25	A
n/o Service Rd	2	Arterial	4,458	414	1,500	0.28	A
s/o Service Rd	2	Arterial	4,457	412	1,500	0.27	A
7th Street n/o Riverc	4	Arterial	15,590	1,559	3,000	0.52	A
Faith Home Rd n/o Redwoodc	2	Arterial	2,890	289	1,500	0.19	A
Moffet Road							
n/o Hatch Rd	2	Maj. Collector	4,256	512	1,250	0.41	A
s/o Glasgow Dr	2	Maj. Collector	5,580	545	1,250	0.44	A
n/o Whitmore Ave	2	Maj. Collector	8,775	871	1,250	0.70	B
Morgan Road							
n/o Whitmore Ave	2	Maj. Collector	5,168	543	1,250	0.43	A
s/o Whitmore Ave	2	Maj. Collector	4,717	442	1,250	0.35	A
n/o Service Rd	2	Maj. Collector	2,713	239	1,250	0.19	A
s/o Service Rd	2	Maj. Collector	1,214	119	1,250	0.10	A
Herndon Road							
n/o Pecos Ave	2	Maj. Collector	6,703	598	1,250	0.48	A
n/o Joyce Ave	2	Maj. Collector	7,526	628	1,250	0.50	A
n/o Hatch Rd	2	Maj. Collector	19,339	1,443	1,250	1.15	F
Richland Ave							
s/o River Rd	2	Maj. Collector	2,189	193	1,250	0.15	A
n/o Hatch Rd	2	Maj. Collector	7,236	659	1,250	0.53	A
s/o Hatch Rd	2	Maj. Collector	6,197	620	1,250	0.50	A
Blaker Road							
s/o Whitmore Ave	2	Min. Collector	7,607	737	900	0.82	D
n/o Service Rd	2	Min. Collector	1,671	175	900	0.19	A
East-West Streets							
Hatch Road							
w/o Crows Landinc	4	Arterial	10,670	1,067	3,000	0.36	A
e/o SR 99	4	Arterial	25,088	1,892	3,000	0.63	B
w/o Richland Ave	4	Arterial	26,041	1,887	3,000	0.63	B
w/o Central Ave	4	Arterial	24,977	1,801	3,000	0.60	B
e/o Payne Ave	4	Arterial	23,143	1,658	3,000	0.55	A
w/o Mitchell Rd	4	Arterial	21,123	1,636	3,000	0.55	A
e/o Mitchell Rd	2	Arterial	12,264	920	1,500	0.61	B
e/o Boothe Rd	2	Arterial	10,245	806	1,500	0.54	A
Whitmore Ave							

TABLE 5-21993 LEVEL OF SERVICE SUMMARY^a

w/o Morgan Rd	2	Arterial	10,638	1,123	1,500	0.75	C
e/o Morgan Rd	2	Arterial	10,155	887	1,500	0.59	A
e/o Blaker Rd	2	Arterial	15,669	1,321	1,500	0.88	D
w/o Central Ave	2	Arterial	18,047	1,364	1,500	0.91	E
e/o Central Ave	4	Arterial	18,670	1,481	3,000	0.49	A
w/o Mitchell Rd	4	Arterial	19,621	1,512	3,000	0.50	A
e/o Moore Rd	2	Arterial	7,219	614	1,500	0.41	A
e/o Boothe Rd	2	Arterial	6,155	479	1,500	0.32	A
Service Road							
w/o Morgan Rd	2	Arterial	3,618	318	1,500	0.21	A
e/o Morgan Rd	2	Arterial	4,374	420	1,500	0.28	A
e/o Blaker Rd	2	Arterial	4,925	486	1,500	0.32	A
e/o Central Ave	2	Arterial	6,286	550	1,500	0.37	A
w/o Mitchell Rd	2	Arterial	8,853	673	1,500	0.45	A
e/o Mitchell Rd	2	Arterial	4,930	410	1,500	0.27	A
Pine Street e/o Central Ave	2	Arterial	9,274	818	1,500	0.55	A
Roeding Road							
w/o Mitchell Rd	2	Min. Collector	3,513	320	900	0.36	A
e/o Mitchell Rd	2	Min. Collector	2,504	222	900	0.25	A
e/o Faith Home	2	Min. Collector	640	64	900	0.07	A
Frontage Roads							
Herndon Avenue							
s/o Hatch Rd	2	Frontage Road	7,131	637	1,000	0.64	B
w/o Richland Ave	2	Frontage Road	5,141	429	1,000	0.43	A
El Camino s/o Sixth St	2	Frontage Road	2,681	243	1,000	0.24	A
Railroad Ave							
n/o Kinser Rd	2	Frontage Road	2,966	302	1,000	0.30	A
n/o Industrial Way	2	Frontage Road	1,294	177	1,000	0.18	A
^a Volumes are 1993 volumes except where noted. All 1993 volumes were obtained from the Ceres Department of Public Works. ^b Volumes for State Route 99 are taken from the Caltrans 1992 Traffic Volumes. ^c Volumes are "Adjusted 1990 Volumes" from the Omni-Means, <i>Traffic Impact Analysis</i> , June 1991. ^d The capacity for South 9th Street north of River has been increased to reflect the observed conditions. ^e The section of Mitchell Road north of Hatch Road has been analyzed as an expressway due to the observed traffic behavior and the spacing between signals.							

On the basis of this analysis, several street and road segments that exceed the LOS standard have been identified. These include:

- Herndon Road north of Hatch Road
- Blaker Road south of Whitmore Avenue
- Whitmore Avenue west of Central Avenue

A site visit was made to confirm these results. While traffic flow and congestion may vary from day to day and within the day, the computations appear to be reasonable estimates of observed conditions on Ceres city streets.

5.1.3 FREEWAY ACCESS

Freeway access is provided at seven locations in the Study Area. However, more than half of these locations do not support full ramp access. Full ramp access is provided at Crows Landing Road, Hatch Road, and Mitchell Road. Partial ramp access is provided at South 9th Street, Whitmore Avenue, North Street, and 4th Street. The design of all State Route 99 interchanges in Ceres is below Caltrans current standards for interchange design.

Observations indicated that the Hatch Road and Whitmore Avenue locations may require upgrading sometime during the next 15 to 20 years. Any such improvements will be severely constrained by the presence of the Southern Pacific Railroad tracks to the west, frontage roads to the east, and existing development in the immediate vicinity of the interchanges. Improvements at the Hatch Road interchange are being designed. It may be of value to conduct a focused planning study on each of the interchanges during this General Plan Update. An evaluation of traffic control at the interchange/arterial intersections may also be conducted by the traffic consultant as part of this General Plan Update.

The Stanislaus County Regional Transportation Plan includes excerpts from the State Highway Operation Protection Program, which in turn identifies the southbound ramp at Hatch Road as an improvement project scheduled for 1995-96. The plan is to widen the bridge and signalize the intersection where the southbound ramp meets Hatch Road.

The interchanges were designed when Ceres existed largely to the east of the highway. As a result, the west side of the city is poorly served by the interchanges. The City is developing the design concept for the Mitchell Road interchange to provide better access to the west side. An evaluation of the need to improve access to the west side could be conducted as part of this General Plan Update, depending upon how much new growth is projected to the west.

5.1.4 REGIONAL EXPRESSWAY STUDY

In response to the concern over the future traffic needs of the county, the Stanislaus Area Association of Governments (SAAG) sponsored a *Regional Expressway Study* to identify potential locations for expressways within the region. The goal was to establish the need for and determine the preferred location for an expressway system and to take the necessary steps toward implementation of the system.

Several roadways within and surrounding Ceres are included as part of the regional expressway system. Hatch Road from Carpenter Road to Faith Home Road and Faith Home Road from State Route 99/Keys to Claribel Road in Riverbank are in the Priority 1 Group of the expressway system. Also included in the system is the loop formed by Carpenter Road and Service Road from Hatch Road around to Faith Home Road. These will be four-lane expressway facilities with interchanges or grade separations at major roadway crossings.

The SAAG Policy Board has approved the expressway study and its funding plan. Ceres has developed their classification system on the basis of the *Expressway Plan*. Although the City has already adopted the plan, an analysis of the air quality impacts need to be resolved by the City before incorporating the *Expressway Plan* into the General Plan.

5.1.5 TUOLUMNE RIVER CROSSINGS

The Tuolumne River provides a natural boundary between the city of Ceres and the city of Modesto to the north, although there are some areas where the boundary has been encroached upon. At this time, the Tuolumne River crossings from west to east include Carpenter Road, South 7th Street, State Route 99, South 7th Street, and Mitchell Road.

A new river crossing at Faith Home Road is planned as part of the expressway system, as a response to the poor service levels on Mitchell Road. In addition, discussion in the past between the Cities of Ceres and Modesto has centered on an additional river crossing connecting Richland Avenue through the Tuolumne River Regional Park to Tioga Drive in Modesto. Modesto no longer supports a river crossing at Richland Avenue; however, as current policy Ceres would still like to see a two-lane roadway crossing at Richland Avenue. The General Plan Update will include an evaluation of the need for one or both new river crossings.

5.1.6 CANNING SEASON

Seasonal traffic generated by Tri-Valley Growers, a cannery plant, significantly affects the amount of traffic on Mitchell Road and Hatch Road. The plant is located off of Mitchell Road about two miles north of the Tuolumne River. Canning season runs from mid-June to early November. Increased traffic due to employee auto trips and trucks trips during the canning season has been estimated to add up to 5,400 trips per day through Ceres leading to significantly increased congestion along Hatch Road and Mitchell Road, since the trucks access Route 99 from Hatch Road to points north and from Mitchell Road to points south. The City's current unwritten policy is to design the roadways to respond to the seasonal peak to the extent possible.

5.2 PARKING

Based upon field observations and discussions with the Public Works Department, parking does not appear to be an issue. As a whole, existing on-street and off-street parking appears to more than adequately serve the demand. However, localized parking issues will need to be reviewed on a project-by-project basis.

5.3 TRANSIT SERVICES AND FACILITIES

Public transportation is provided by several transit organizations including Ceres Dial-A-Ride, Modesto Intracity Transit and Modesto Dial-A-Ride, Stanislaus County Transit, and Central Dial-a-Ride.

Ceres Dial-A-Ride (DAR) offers a demand-responsive service weekdays from 6:00am to 8:00pm, and on Saturday from 10:00 am to 6:00 pm. The fare is \$.75 for a ride within the service area which is bounded by the Tuolumne River, Boothe Road, Whitmore Avenue, Faith Home Road, Redwood Road, Central Avenue, Grayson Road, Crow Landing Road, Whitmore Avenue, and Herndon Road. This service is available to anyone within the service area with a minimum of 30 minute advance call. The Ceres DAR serves over 200 passengers per day. During the 1994-1995 fiscal year, an estimated 64,556 passengers were served. The program operates through contract with Laidlaw. Passengers can transfer from the Ceres Dial-A-Ride to Modesto Area Express (MAX), the Modesto/Turlock bus service, or the Modesto Dial-A-Ride.

The Modesto Area Express provides fixed route bus service in the City of Modesto and the immediate surrounding area, including northern Ceres. The transfer point to Modesto Area Express Routes 3 and 15 is located at the northeast corner of Herndon and Hatch Roads by the K-Mart Shopping Center. The Modesto Area Express operates 16 fixed routes during the week from 6:15 am to 6:30 pm and on Saturdays from 8:15 am to 6:15 pm.

Stanislaus County Transit (SCT) operates the Modesto/Turlock Bus Service from downtown Modesto to downtown Turlock via Ceres and Keyes. The bus stop is located on the southwest corner of the intersection of Third Street and Magnolia Street by the Library. SCT provides ten departures daily, with morning and evening express service.

Modesto Dial-A-Ride offers service in the Modesto urban area, including Salida, Empire, and part of north Ceres. The service gives priority to senior citizens and disabled residents. Evening service is open to the general public. This service requires a two-hour advance call.

For intercity service between Ceres, Modesto, Turlock, Oakdale, Riverbank, Hughson, and Waterford, the Central Dial-A-Ride provides service with a 24-hour advance call. This service is offered weekdays from 7:30am to 5:00pm for a fare of \$1.50 with a discount of \$.50 for senior and disabled passengers.

According to the *Circulation Element* and *Traffic Impact Analysis* for the city of Ceres prepared by Omni-Means, the ridership profile indicated that the majority of the patrons are women, elderly, disabled, students, and low-income workers, drawing the conclusion that the role of public transportation as an alternative means of transportation to the average commuter is somewhat limited. The ridership record seems to suggest that most regional and local transit needs are met.

5.4 BICYCLE FACILITIES

The City is in the process of implementing a bikeway plan which is comprised of a network of bicycle paths and lanes. The *Ceres Bikeway Plan* includes three types of bicycle facilities. Class I facilities are paths independent of the roadway with a minimum width of 8 feet. Class II facilities are striped areas or lanes designated for bicycle use located within roadways. Class III facilities are bike lanes on designated roadways, usually collectors or local streets, that are marked primarily by signs. Many of the Class III bike paths east of Route 99 and south of Hatch Road have been signed. The concept behind the bicycle route system is to link open space, school facilities, major commercial centers, and areas of employment within the city's sphere of influence.

5.5 PEDESTRIAN FACILITIES

State Route 99 and the Southern Pacific Railroad tracks form a major barrier to pedestrian access between the east and west sides of the city. This problem exists throughout the community, but is of particular concern in the downtown area. The Pine Street and Whitmore Avenue overcrossings are the only pedestrian access from the west side residential area to the downtown/high school area. Residents seeking a "short-cut" have been known to climb the fence to cross the railroad tracks and walk along the side of the freeway ramps to cross under Route 99. The City has looked at the possibility of an underground walkway or a pedestrian overpass and concluded that the most feasible option is to improve the existing access at Pine Street and Whitmore Avenue.

All city streets have sidewalks with the exception of a few locations in the older areas. Pedestrian access throughout the whole city should be reviewed by the traffic consultant as part of the General Plan Update. This review should cover both the physical and the funding issues of providing improved access to pedestrians.

5.6 RAIL FACILITIES AND SERVICES

The Union Pacific and Southern Pacific Railroad Companies (now merged) are transcontinental railroad systems that operate freight services through Stanislaus County and the San Joaquin Valley. The Southern Pacific tracks through Ceres are at-grade parallel to State Route 99. The Union Pacific's Tidewater Southern tracks run between Stockton and Turlock to the east of Ceres between Crows Landing Road and Morgan Road.

Within the city limits, there are no at-grade crossings of the Southern Pacific tracks.

Rail passenger service is not provided on the rail facilities in the Study Area. Amtrak operates its valley service on the Atchison Topeka & Santa Fe Railroad lines, which are east of Ceres. The closest station is at Riverbank, which lies approximately six miles to the north of Ceres. Despite Amtrak's decision to continue service on the Atchison Topeka & Santa Fe tracks, the *Stanislaus County Regional Transportation Plan* continues to support the relocation of Amtrak service to the Southern Pacific tracks which are closer to the population centers in the valley.

5.7 AIR TRANSPORTATION

Ceres is served by the Modesto City-County Airport, which provides the only commercial service in the county. The airport is located immediately north of the Study Area across the Tuolumne River at nearly the geographic center of the county. According to the *Modesto City-County Airport Master Plan*, it is the "oldest publicly owned airfield in the U.S., with an original dirt runway built in 1928."

The airport has two runways for general aviation and commercial uses. The 5,911-foot runway more than adequately serves the commercial uses, while the 3,459-foot runway is used for general aviation purposes. In 1988, the airport terminal served about 20,000 boarding passengers and the airport facilities handled approximately 28,000 pounds of air cargo.

The airport serves the general aviation and commercial service needs of Stanislaus County drawing primarily from the Modesto-Ceres urbanized area. With the departure of United Airlines in 1980, the airport no longer offers air carrier service with jet aircraft. However, during the week United Express offers commuter service with seven flights a day to the Bay Area for connecting flights elsewhere. This service meets the current (1993) needs of the public.

According to the *Airport Master Plan*, the City of Modesto has plans for expansion and improvements. As the population and economy of the county grows over the next 20 years, the plan envisions an expansion of corporate aviation facilities, an increase in the number of T-hangars for general aviation aircraft, the relocation and expansion of the helipad area, infrastructure improvements, and the re-institution of air carrier service utilizing jet aircraft. The plan also proposes commercial uses near the passenger terminal.

Regional access to the airport is from either Route 132 to the north or Route 99 to the south. The air carrier terminal is served by Airport Way, while the general aviation terminal is accessed via Tioga Drive. The *Master Plan* for the airport found these access roads adequate to meet the needs of the airport users. The Modesto Area Express as well as the Modesto Dial-A-Ride service offer public transportation to and from the airport.

5.8 FINDINGS

- X Overall, the City's circulation system is in excellent condition. Although problems dominate this discussion, they represent a small proportion of the system as a whole.
- X Although Ceres has several access points to State Route 99, the design of the ramps are substandard and will need to be improved in the future.
- X With the Tuolumne River as a natural boundary between Modesto and Ceres, the need for new river crossings becomes more acute as each city continues to expand and grow. The need and location of future river crossings will be investigated as part of the General Plan Update process.
- X Planned improvements to the street and roadway system incorporate the plans and policies of the Regional Expressway System.
- X Pedestrian access from the west side residential areas to the downtown area should be studied to determine the need for additional safe and direct pedestrian routes.
- X Parking supply appears to be adequate for existing development levels. If the General Plan Update proposes intensified uses, a parking analysis may need to be performed to insure an adequate supply.
- X Public transportation appears to be sufficient to meet the existing needs of the residents. However, as the city continues to grow, the transit needs may be reassessed as part of the City's normal ongoing review of transit service.
- X Existing facilities at the Modesto City-County Airport are sufficient to meet the air travel demands; however, future plans include expansion and improvements to the existing facilities with the hopes of luring an air carrier with jet aircraft back to Modesto.

5.9 PERSONS CONSULTED

Guillette, Len, Supervisor, Ceres Department of Public Works

Holland, Joseph, Transportation Planner, City of Modesto, Public Works and Transportation Department

Hollstein, Joe, Director, Ceres Department of Public Works

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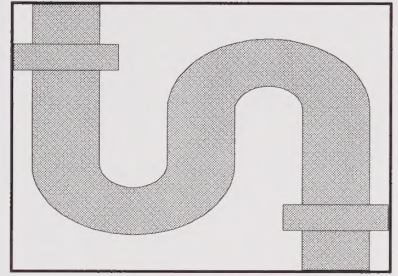
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CHAPTER

INTRODUCTION

AND SUMMARY



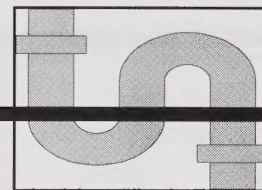
CHAPTER 6

PUBLIC FACILITIES AND SERVICES



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CHAPTER 6 PUBLIC FACILITIES AND SERVICES



6.0 INTRODUCTION

City development is dependent on an elaborate network of public facilities and services. Each type of service has a unique set of constraints and must adapt to growth and change differently. This chapter focuses primarily on water service, wastewater collection and treatment, drainage, schools, fire protection, and law enforcement, describing the various systems and their capacities and discussing their implications for the general plan.

Transportation facilities and services are discussed separately in Chapter 5 and parks and recreational facilities are discussed in Chapter 7.

6.1 WATER SERVICE

6.1.1 BACKGROUND

The City of Ceres operates the water distribution and supply system serving the city. The water system provides service to most residents of the city as well as commercial and industrial users. Several documents have been prepared that address Ceres' water system. The City's *Water System Master Plan* was prepared by TOUPS Corporation in December 1975. The *Master Plan* identified deficiencies in the existing system and developed a plan for future expansion for a population of 29,000 persons. A *Drinking Water Supply Study* was prepared by Brown and Caldwell Consultants in June 1990. The report investigated the water supply needs of the urban water utilities within the Turlock Irrigation District (TID) service area. The report describes the characteristics of the groundwater and surface water resources, relates the status of drinking water regulations, defines the water supply alternatives, and presents an environmental, economic, and noneconomic comparison of the alternatives. A *Phase 3, Project Facilities Planning, Drinking Water Supply Program* was subsequently prepared for the Turlock Irrigation District by Brown and Caldwell in February 1992 to address alternatives for providing potable water supplies.

Chapter 8, *Natural and Agricultural Resources*, discusses the area's surface and groundwater quality.

6.1.2 SERVICE AREA

The City's water system serves virtually all areas within the existing city limits. The few exceptions are an area in the northern part of the city served by the Del Este Water Company and several unincorporated islands of development served by private wells. In addition, a section in the northwestern part of the General Plan Study Area is served by the City of Modesto.

6.1.3 DEMANDS

While the City does not meter its residential water users, it has prepared monthly estimates of water use based on well production logs (see Table 6-1). According to these records, the average water demand for the city is approximately 210 gallons per capita per day (GPCD), including industrial and commercial demand.

Month	1990 Productions (Gallons)	1991 Production (Gallons)	1992 Production (Gallons)	1993 Production (Gallons)
Jan	52,035,800	107,440,100	88,198,200	85,001,000
Feb	83,633,500	102,628,500	86,119,600	91,099,100
Mar	116,714,400	97,139,500	109,642,400	106,706,000
Apr	185,935,800	145,543,100	175,469,300	181,076,000
May	203,343,900	230,366,700	237,438,600	216,581,000
Jun	202,861,300	222,909,600	260,770,800	240,506,200
Jul	284,168,700	267,499,600	268,285,000	302,447,800
Aug	274,948,100	236,758,600	278,198,110	299,201,200
Sep	233,488,300	243,893,600	232,010,000	220,707,200
Oct	144,356,600	188,305,900	258,236,000	200,281,400
Nov	128,150,500	130,428,000	122,680,000	140,627,700
Dec	105,851,100	108,785,200	103,357,100	113,273,700
Total	2,015,488,000	2,081,698,400	2,220,405,110	2,197,508,300

Source: City of Ceres Well Production Logs, 1990 to 1993

The *Phase 3, Project Facilities Planning, Drinking Water Supply Program* estimated the peak day and peak hour demand for the city. These are shown in Table 6-2.

Land Use	Max Day	Persons/Ac.	Peaking Factor	Peak Hour
Residential				
R-A	381 GPCD	8	1.8	3.81 GPM/AC
R-1	381 GPCD	14	1.8	6.67 GPM/AC
R-2	381 GPCD	20	1.8	9.53 GPM/AC

R-3 & 4	381 GPCD	30	1.8	14.29 GPM/AC
Commercial	assumed to be included in residential demand			
Industrial	assumed to be included in residential demand			
Schools	assumed to be insignificant during peak periods			
Gallons per Capita per Day (GPCD)				
Gallons per Minute per Acre (GPM/AC)				
Source: Turlock Irrigation District, Phase 3, Project Facilities Planning, Drinking Water Supply Program, Brown and Caldwell, February 1992				

The Master System Water Plan identified a fire flow of 3,000 GPM for industrial developments with a minimum residual pressure of 20 pounds per square inch (psi). There were no fire flows identified for other types of development.

6.1.4 FACILITIES

Supply

The City of Ceres uses groundwater as its only source of supply. There are seven wells currently on line: Kinser, Rockefeller, Paramount, Hatch/Mitchell, Hatch/Moffet, Roeding Heights, and Smyrna. These wells have a combined capacity of approximately 14.8 million gallons per day which can serve approximately 39,000 people with all wells on line and 31,000 with one well out of service. The locations of these wells are shown in Figure 6-1. In addition, there are two wells that are not on line: Hollister and Firestines. These two wells, which were shut down because of poor water quality or low production rates, could be used in an emergency situation.

Test wells have been drilled to locate additional wells. Water quality tests were taken from the wells and the test results exceeded the maximum contaminant levels (MCL) for drinking water and, therefore, despite investigations, no additional suitable well sites have been identified as of May 1994.

A Drinking Water Supply Program, Phase 3 - Project Facilities Planning was prepared by Brown and Caldwell for the Turlock Irrigation District (TID) and local water providers within the TID. This report identified two sources of surface water that could be used to serve the urban water utilities within the TID. These alternatives, diversion of Tuolumne River water at Ceres and diversion from the TID canal system at Turlock Lake, could supply 100 percent surface water to the city. The surface water would have to be treated to comply with the State of California's drinking water standards. A conjunctive use of surface water and groundwater was also discussed as an alternative. The water source and quality issues associated with surface water use in Ceres are discussed at length in Chapter 8, Natural and Agricultural Resources.

Booster Pump Stations and Storage Facilities

A 1.5 million gallon reservoir and booster pump station used to meet peak demand were constructed in 1992 at the intersection of Service Road and Blaker Road. The site has adequate space to construct an additional 1.5 million gallon reservoir when necessary. The booster pump station has 4 pumps with the capacity to pump 1,500 gallons per minute (GPM) each. The pump station is controlled by three remote pressure sensors located in the distribution system. The location of the booster pump station and reservoir are shown in Figure 6-1.

Transmission and Distribution

As demand has increased, the supply capacity of the water system has been expanded by constructing new wells in areas of new development. Few major transmission facilities were necessary until the reservoir was constructed. As part of the construction of the reservoir, a 24-inch main was constructed in Service Road from the reservoir site to Mitchell Road. Figure 6-1 shows existing pipelines that are a minimum 10-inches in diameter.

The Drinking Water Supply Program, Phase 3 - Project Facilities Planning prepared by Brown and Caldwell shows the routing of the transmission main for the surface water supply scenario. The main supply will be in the northern and eastern area of the city. New transmission mains will be required to deliver water throughout the existing distribution system.

6.2 WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

6.2.1 BACKGROUND

The City of Ceres provides sanitary sewer collection and treatment facilities for residential, commercial, and industrial development within the city limits, with two exceptions. The area of the city north of Hatch Road and west of Central Avenue is served by City of Modesto facilities, and there are unincorporated islands of development within the existing city limits that are served by private septic systems.

Ceres' sanitary sewer system consists of a network of pipelines, lift stations, and a wastewater treatment plant. The conveyance system consists of vitrified clay and reinforced concrete gravity pipelines. The lift stations are wet pit type with submersible pumps. The treatment plant provides secondary treatment with land disposal. Figure 6-2 shows the major components of the collection system.

6.2.2 COLLECTION SYSTEM

Nearly all of the gravity sewers and trunk lines of 15-inch diameter and smaller are vitrified clay, while gravity trunk lines that are 18-inch diameter and larger are reinforced concrete with rubber gasket joints.

There are nine existing pump stations on the existing collection system and one pump station at the treatment plant headworks. The capacity and conditions of five of the pump stations (Pine Street, Central/Evans, Barbour, Paramount, and Treatment Plant) were summarized in the 1983 Sewer System Study. The other five pump stations have been constructed since the Sewer System Study was completed. The Sewer System Study stated that the existing sewerage system was inadequate to accommodate future flows and proposed new lines for future expansion. An additional analysis will be required to determine the location and sizes of trunk lines to serve additional growth.

6.2.3 TREATMENT FACILITIES

The City Engineer stated that the average dry weather capacity of the existing treatment plant is approximately 2.5 million gallons per day (MGD) and Phase I expansion would increase the capacity to 3.5 MGD. The ultimate capacity of the treatment plant will be 9.3 MGD. The City will attempt to fund the treatment plant expansions through revenues collected from connection fees, however other funding sources may be required to fund the treatment plant expansions.

The Sewer System Study estimated 100 gallons per capita per day (GPCD) for the wastewater flow rate, including average contributions from industrial and commercial development. Based on this assumed flow rate, the existing treatment plant can accommodate a population of approximately 25,000. Since part of the city is served by the City of Modesto's wastewater treatment plant and some areas use septic systems, the existing treatment facilities currently have excess capacity to allow for some additional growth, much of which is already committed to approved development projects. The ultimate treatment plant could be expanded to accommodate a population of 93,000 assuming that only dry industries are allowed to develop in the city. Currently, the treatment plant does not provide for treatment of industrial wastes and, by ordinance, the City accepts only new wastewater discharges from dry industries.

6.2.4 DISPOSAL FACILITIES

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The City's sanitary sewer system currently uses percolation/evaporation ponds and land disposal for discharge of the treated wastewater. The Turlock Irrigation District (TID) is planning a steam generation plant that will be capable of disposing approximately 200,000 gallons per day of this treated water. The *Wastewater Treatment Facility Expansion Study 1990 Update* reviewed eight alternatives for disposal of treated wastewater. The recommended alternative was to convert the treatment plant to advanced or tertiary level treatment with year-round discharge to the TID Westport Drain or the San Joaquin River.

6.3 STORM DRAINAGE AND FLOOD PROTECTION

6.3.1 BACKGROUND

Original storm drainage improvements consisted of catch basins and dry wells with some gravity lines that were pumped into TID laterals or fed by gravity into the State Route 99 freeway system. The majority of Ceres' existing storm drainage system has been developed since the early 1970s, generally using detention basins and metering the flow into the TID canal system through pumps. The City also has two gravity outfalls to the Tuolumne River that serve some of the area north of Hatch Road. The availability of the TID canal system throughout the city's service area will enable the City to expand the positive storm drainage system without the need for an extensive trunk system.

6.3.2 STORM DRAINAGE FACILITIES

Ceres' residential storm drain system consists of nine small regional park/detention basins: Westpointe Park, Don Pedro Park, Redwood Park, Roeding Heights Park, Persephone Park, Smyrna Park, Independence Park, Berry Grove Park, and Riverview Park. Additional local detention basins in the city generally operate independently of each other with gravity or pump station/force main outfalls to TID laterals, Ceres Main Canal, and the Tuolumne River. The detention facilities and pump stations are shown on Figure 6-3. The system also contains a limited number of catch basin/drywell, percolation basin and french drain systems. The city does not have a comprehensive storm drainage trunk system generally because of the availability of TID facilities throughout the developed area. Most of the collection and disposal pipeline facilities are less than 48 inches in diameter.

Much of the commercial area of the city is served by the same storm drain system used by the residential areas, although some commercial developments are also served by on-site retention basins where positive drainage systems are not available. Most of the industrial area is served by retention basins where positive drainage systems are not available. This includes off-site and on-site runoff. Future industrial development will be required to dispose of stormwater runoff on-site through evaporation/percolation basins.

The Turlock Irrigation District (TID) has historically cooperated with the City of Ceres and has allowed limited amounts of stormwater to be disposed of through its irrigation facilities. Because the canal system has less capacity as it moves downstream (the opposite of a storm drain system), only a limited amount of stormwater can be disposed of in its system. Additionally, there are times during the off irrigation season when the TID needs to perform maintenance on their canal system and cannot accommodate storm runoff. This limitation requires that the City be able to store runoff in detention facilities during the times the TID system cannot take the runoff. The discharge of stormwater may require treatment to reduce contaminants to comply with current National Pollution Disposal Elimination System (NPDES) standards. The disposal of stormwater into TID facilities may be contingent on the City complying with the NPDES standards.

It is anticipated that new development in Ceres' sphere of influence generally on the west, east, and south will be drained using stormwater detention with disposal to TID facilities. Most of the areas developed to the north of the existing city will probably drain into the Tuolumne River through detention basins and a trunk line system. All stormwater disposal will have to comply with applicable NPDES standards.

6.4 SCHOOLS

6.4.1 ELEMENTARY AND SECONDARY SCHOOLS

The Ceres Unified School District (CUSD) and Modesto City Schools provides public educational services to the residents of the Study Area, with CUSD being the largest provider of primary and secondary education. Modesto City Schools provides services to the central part of the Study Area north of Hatch Road and the westernmost section west of Crows Landing Road and north of Service Road.

In the 1993 and 1994 school year, CUSD operated seven elementary schools, one middle school, one high school, and one continuation high school. Three elementary schools are operating on a year-round schedule. The public school facilities are shown on Figure 6-4. Total enrollment for the district as of January 1994 was 8,224 students.

CUSD provides a variety of programs that are tailored to meet the needs of its students. These programs include reading, math, and language resource programs for children requiring special attention. Bilingual programs, English as a second language, migrant education, special education programs, a GATE program for academically advanced children, preschool services, and participation in the state funded Headstart Program are also offered in the District.

CUSD recently constructed two additional facilities: the Blaker/Kinser Middle School will serve students in the 7th and 8th grades and Samuel Vaughn School will offer traditional K-6 services. The District is also in the process of selecting a site for a second high school.

In conjunction with the opening of the new schools, the District is revising all of the existing attendance boundaries. As a result, the District has prepared projected enrollment figures by school for the 1994-95 school year as shown in Table 6-3. The capacity figures include the use of emergency portable classrooms and factors for year-round education and half day kindergarten classes. Special education classes, preschool, Headstart, and child care programs are not included in capacity or enrollment estimates. To address the facility needs associated with enrollment growth, CUSD collects development fees and applies for State funding. The District may also need to implement additional year-round scheduling as necessary to reduce the need for additional facilities. In addition, the City and CUSD District have an agreement for addressing school mitigation in connection with new development. (Resolution 94-111).

Following are brief discussions of the location, resources, and enrollment of each CUSD school in the city.

Carroll Fowler Elementary

Carroll Fowler Elementary, which is located at 2611 Garrison Street, is a neighborhood school (K-6) with state funded Headstart Program for low income students throughout the district, special reading, language, and math resource programs. Enrollment as of January 1994 was 924 students.

Caswell Elementary

Caswell Elementary is a year-round neighborhood K-6 school located at 1800 North Central Avenue. It also has a Special Education Program for physically and learning disabled children throughout the district. Caswell also offers bilingual, migrant education facilities and math, reading, and language development classes. Current enrollment as of January 1994 is 908 students.

Don Pedro Elementary

Don Pedro Elementary is a year-round neighborhood school (K-6) with preschool program and special math, reading, and language programs. It is located at 2300 Don Pedro Road. Current enrollment as of January 1994 is 1,013 students.

Virginia Parks Elementary

Virginia Parks Elementary is located at 1021 Moffet Road. It is a neighborhood school (K-6) with special math, reading, and language programs. Current enrollment as of January 1994 is 680 students.

Walter White Elementary

Walter White Elementary, which is located at 2904 Sixth Street, is a year-round neighborhood school (K-6) with special education program for the hearing impaired as well as the physically and developmentally disabled. Current enrollment as of January 1994 is 951 students.

Westport Elementary

Westport Elementary is a neighborhood school (K-6) with preschool program and special math, reading, and language program serving a rural district outside the city limits. It is located at 5218 South Carpenter Road. Current enrollment as of January 1994 is 499 students.

TABLE 6-3 CERES UNIFIED SCHOOL DISTRICT CAPACITY AND ENROLLMENT 1994-1995 SCHOOL YEAR

School	Capacity	Enrollment
Elementary		
Carroll Fowler	660	653
Caswell	888	889
Don Pedro	878	900
Virginia Parks	630	660
Walter White	924	862
Westport	480	467
Samuel Vaughn	600	619
Subtotal, Elementary	5,060	5,050
Middle School		
Mae Hensley	917	922
Blaker / Kinser	446	430
Subtotal, Middle School	1,363	1,352
High School		
Ceres High	2,049	1,892
Argus Continuation	300	345
Subtotal, High School	2,349	2,237
Total Enrollment	8,772	8,639
Source: Ceres Unified School District, 1994		

Mae Hensley Junior High School

Mae Hensley Junior High, located at 1806 Moffet Road, serves grades 7 and 8 in the Ceres area. It has a bilingual program as well as programs for math, reading, and language skills. Current enrollment as of January 1994 is 1,252 students.

Argus High School

Argus High School is a continuation high school (9-12) located at 2555 Lawrence Street that serves the students of the Ceres area who have needs outside the traditional high school setting. Argus also offers adult classes for students attempting to get their GED Certificate. Current enrollment as of January 1994 is 233 students.

Ceres High School

Ceres High School (9-12), which is located at 2320 Central Avenue, serves the Ceres area with traditional high school services including vocational training and bilingual services. Current enrollment as of January 1994 is 1,774 students.

Students within the Modesto City Schools boundaries attend schools in Modesto.

Additional private educational opportunities also exist in the Ceres Area. These facilities include the Modesto Seventh Day Adventist Academy and Ceres Baptist School. The County-operated John F. Kennedy School specializes in educational opportunities, and independent living for physically and learning disabled children. The center is located in the Ceres area, but serves the entire county.

6.4.2 COLLEGES/UNIVERSITIES

Ceres residents have access to higher education facilities located throughout Stanislaus County. These facilities include the Modesto Junior College located to the north in Modesto which offers a range of vocational, specialized training, and transfer courses suitable for a four year college or university. California State University Stanislaus, located to the south of Ceres in Turlock, is part of the California State University System and offers a variety of Bachelor and Masters degree programs.

6.5 FIRE PROTECTION

The Emergency Services Division of the City of Ceres Department of Public Safety provides fire protection and emergency services within the City of Ceres city limits as well as some of the surrounding areas. The division staff also respond to calls for assistance outside their service area when requested by other fire departments. The City recently took over part of the former Industrial Fire District and its service area; this station, which is now known as Station No. 2, serves the area south of the Tuolumne River and east of South Seventh Street that is within the city's sphere of influence, but outside the current city limits. In addition, the Department also provides services on a contractual basis to rural areas outside the city limits. This area is known as the Ceres Fire Protection District and is shown in Figure 6-5.

The Department presently operates out of two stations: Station No. 1, located at 2225 North Avenue, and Station No. 2, located at 830 Pecos Avenue. Future plans to serve the west side of the city include the construction of a jointly-operated City-County facility to be located at the Stanislaus County Public Safety Center site on Hackett Road. Future plans on the eastern side of Ceres would likely involve the City-owned property at the corner of Fowler and Boothe Roads.

The City currently employs a Commander, Battalion Chief, and Fire Marshall at the staff level and one secretary, three Fire Captains, and nine firefighters at the station level. The department relies heavily on volunteers and currently trains forty-three volunteers. The equipment available to each fire station is detailed in Table 6-4.

TABLE 6-4 AVAILABLE EQUIPMENT City of Ceres Department of Public Safety Fire Division 1994

Station No. 1	Station No. 2	Ceres Fire Protection District
1-1990 Pumper Engine 1-1985 Pumper Engine 1-1972 Pumper Engine 1-Heavy Rescue Truck 1-Medical Van 2-Staff Sedans 1-Staff Pickup	1-1991 Pumper Engine 1-1985 Pumper Engine	1-Tanker Tender 1-1970 Pumper Engine
Source: City of Ceres Department of Public Safety Fire Division, January 1994		

Future building and equipment needs are anticipated to include a new main station and two satellite stations, a new truck company (snorkel), a new heavy rescue unit, radio and communications equipment, and a new pumper for each station.

Personnel needs will include a training program staffed with full time personnel and additional staff to bring the department up to the national average of 1 paid firefighter per 1,000 residents being served. The Department is currently operating well below this goal and hopes to move from a volunteer based department to a full time paid department.

The Department's average response time varies depending on the circumstances. The Department estimates the first response is usually between three and five minutes with additional backup arriving as needed.

Table 6-5 shows the number of fire and medical aid calls that the departments responded to over the last four years. The Department responded to 2,122 calls in 1993 and are projected to respond to 2,680 calls in 1994.

Public fire protection classifications are designated by the Insurance Services Office (ISO). This rating is based on three main factors: location, personnel, and equipment (50 percent), water supply and fire flow capacity (40 percent), and communications capabilities (10 percent). The ratings are based on a scale of 1 to 10 with 1 being the highest possible rating and 10 the lowest. The 1993 ratings for the City of Ceres Station No. 1 is 4, Station No. 2 maintains a rating of 9 which is also the rating maintained by the Ceres Fire Protection District. These low ratings are primarily related to the lack of fire hydrants and the substandard water conveyance system in the areas these districts serve.

In addition to fire suppression and emergency medical services the department provides other services: building inspection, fire prevention, public education, emergency medical services, arson investigation, a juvenile fire setters program, nuisance abatement, building plan review, and arson investigation.

TABLE 6-5 SUMMARY OF YEARLY RESPONSES City of Ceres Department of Public Safety Emergency Services Division 1989-1993

Year	Emergency Medical	Fire	Other	Total
1989	936	393	159	1,488
1990	1,090	409	289	1,788
1991	1,050	376	407	1,833
1992	1,046	422	275	1,743
1993	1,263	488	371	2,122
1994	1,495	578	379	2,452
1995	1,545	570	406	2,521
1996	1,709	641	390	2,740

Source: City of Ceres Department of Public Safety Emergency Services Division, February 1997.

6.6 LAW ENFORCEMENT

In 1991 the City of Ceres Department of Public Safety was reorganized into two divisions, Police and Emergency Services. The Police Division is responsible for providing traditional law enforcement services to the residents within the city of Ceres. The Police Division is located within the Public Safety Building at 2727 Third Street and includes: Administrative Offices, Investigative Bureau, Patrol Bureau, Record Bureau, Volunteers in Public Service Training, Community Service Officers, Computer Information Services, Central Dispatch Office, parking facility, and a storage area for equipment.

As of January 1994, the Division consisted of approximately 34 sworn officers including the Chief of the Public Safety Department, 15 non-sworn officers, and 45 volunteers in addition to volunteer Fire Department personnel. The Division is currently operating at a staffing level of 1.1 officers per 1,000 residents.

The number of officers on patrol at any one time ranges from three to six plus a shift supervisor. The average staffing is one officer per patrol unit. Response times are categorized according to the severity of the offense or complaint. Depending on the priority of the offense the department estimates it can have an officer on the scene within five minutes of the initial call.

The Police Division will respond to requests from other agencies outside the city limits when necessary. The other agencies include the California Highway Patrol, Stanislaus County Sheriff, City of Modesto Police Department, and City of Hughson Police Department. Table 6-6 details the type of offenses that have been documented by the Department of Public Safety over the last three years. These offenses are broken down by month and year and are limited to Type 1 offenses.

Anticipated needs for the law enforcement division include: upgrading the existing communication system, addition of motorcycle officers, K-9 units, participation in regional airborne law enforcement, and community policing stations in conjunction with future fire stations.

TABLE 6-6 SUMMARY OF PART I OFFENSES 1991-1993 City of Ceres Department of Public Safety Police Division

Type of Offense	1991	1992	1993	1994	1995	1996
Homicide	1	2	0	0	1	0
Rape	14	10	9	8	9	13
Robbery	56	47	35	38	57	46
Assault	130	124	140	135	189	204
Burglary	459	442	455	367	444	434
Theft	1,318	1,224	1,303	1,421	1,550	1,285
Auto Theft	164	209	294	294	315	199
TOTAL	2,142	2,058	2,236	2,263	2,565	2,181
Stolen Property	\$1,579,184	\$1,608,721	\$1,849,776	\$2,051,740	\$1,613,210	\$1,782,302

Source: City of Ceres Department of Public Safety Police Division, February 1997.

6.7 SOLID WASTE DISPOSAL

Solid waste disposal in Ceres is provided by a franchise agreement with Bonzi Ceres Disposal. Under the franchise agreement over 8,000 residences are served with residential trash and curbside recycling collection services. These services include once a week collection for single family homes, mobile homes, and multiple family residences. The residential rates are currently \$15.50 for 90 gallon wastewheelers and \$11.60 for a 60 gallon container.

Commercial and industrial solid waste disposal is also provided by Bonzi Ceres Disposal. Rates vary depending on the size of the container and frequency of pick up.

There is no separate charge for picking up recyclable materials in the Ceres area. Containers are provided for those who indicate a willingness to participate in the recycling program. However, Bonzi Ceres Disposal does not have an exclusive franchise to collect recyclable materials from multi-family residences, public institutions, and commercial or industrial establishments. Other recycling collectors and scrap yards operate within the current City of Ceres sphere of influence although not under a franchise agreement.

Bonzi Ceres Disposal also owns the B & B transfer station which is located on Crows Landing Road. Wastes are brought to the station and checked for salvageable and hazardous materials prior to being sent to the waste-to-energy facility in western Stanislaus County. Recycled materials are stored on site prior to being sold or transferred to Bonzi Recycling which is also located in Ceres. A portion of the recyclable materials are taken to Gilton Resource Recovery Transfer Facility where they are separated and sent to market.

Residuals from the waste-to-energy facility and non-transformable wastes are taken to the Fink Road Landfill. The current anticipated life of the landfill is 15 years. The tipping fee for both the waste-to-energy facility and the Fink Road Landfill is \$26.50 per ton.

The City of Ceres Public Works Department carries out the solid waste management policies. Policy level recommendations to the City Council are developed by staff in conjunction with the Ceres Solid Waste/Recycling Advisory Committee.

The City of Ceres is also working under the guidelines established by AB 939 (California Integrated Waste Management Act of 1989). The overall goal of this legislation is to reduce the total wastes generated that are sent for disposal. This goal is being attained while concurrently promoting the integrated solid waste management hierarchy as established by AB 939 in the following order:

1. Source reduction;
2. Recycling and composting; and
3. Environmentally safe transformation and land disposal of solid wastes.

The law requires that a minimum of 25 percent of the total wastes generated are diverted by 1995 and a minimum of 50 percent by the year 2000.

6.8 OTHER FACILITIES AND SERVICES

6.8.1 LIBRARY

The Frances C. and Florence L. Gondring Memorial Library, a branch of the Stanislaus County library, is located at 2250 Magnolia Street. The Stanislaus County system has a main library and 13 branch libraries.

In 1993 the Gondring Library and one permanent employee and one part-time employee. The City provides custodial services to support the library. The library has reduced its hours to 23 hours per week due to budgetary constraints. The library contains approximately 30,000 volumes and provides reference and information assistance for patrons. The library staff estimates that an additional 30,000 volumes are needed to handle the required demand to adequately serve the community.

6.8.2 GAS SERVICE

Natural gas service is provided by Pacific Gas and Electric Company. This privately-owned utility company operates throughout Northern California under authority from the California Public Utilities Commission.

Natural gas is conveyed through Ceres through a network of 8-inch and 6-inch transmission mains with the main trunkline consisting of a 26-inch line adjacent to Interstate 5. The main source of the gas is from Canada with some of the gas being produced in California.

6.8.3 ELECTRICAL SERVICE

Electrical service is supplied by the Turlock Irrigation District, a publicly-operated special district.

There are ten transmission lines supplying the Ceres area. The main source of power is generated from hydroelectric power from the LaGrange Dam and the Don Pedro Dam. The TID can also purchase power from the Western Power Grid and the City of San Francisco during peak demand periods or emergencies.

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The electrical transmission lines supplies four distribution substations in Ceres: the Roeding substation located at Roeding Road and Moore Road, the Gilstrap substation located at Service Road and Morgan Road, the Crows Landing substation located at Crows Landing Road and Hatch Road, and the Ceres substation located at Central Avenue and Hatch Road.

6.8.4 TELEPHONE SERVICE

Pacific Bell provides telephone service to Ceres. It has a central office in Turlock.

6.9 FINDINGS

- The City currently uses groundwater as its sole source of supply. The Turlock Irrigation District and public water purveyors within the District boundary have begun planning a surface water treatment and conveyance system to use treated surface water as a source of supply for the city.
- The City has constructed an above ground storage reservoir and booster pump station to supply water during peak hour demand.
- The City estimates that its current treatment wastewater facilities can serve a population of approximately 25,000 and can be expanded to accommodate approximately 93,000 with associated commercial and industrial uses, assuming dry industries only. Expansion would require tertiary treatment with disposal to the San Joaquin River or the Turlock Irrigation District Westport Drain. Some areas of the city are served by the Modesto wastewater treatment plant and some areas use individual septic systems.
- It is anticipated that new development in the City's sphere of influence generally on the west, east, and south will be drained using stormwater detention with disposal to TID facilities. Most of the areas developed to the north of the existing city will probably drain into the Tuolumne River through detention basins and a trunk line system. Industrial development will dispose of stormwater runoff on-site using evaporation/percolation basins. All stormwater disposal will have to comply with applicable NDES standards.
- The Ceres Unified School District is constructing two additional facilities, a new middle school which will be known as the Blaker/Kinser Middle School and serve students in the 7th and 8th grades and an elementary school tentatively named Samuel Vaughn School which will offer traditional K-6 services. The two new schools are scheduled to be opened by Fall of 1994.
- The Fire Department presently operates out of two stations. Future plans to serve the west side of the city include the construction of a jointly operated City-County facility to be located at the existing Stanislaus County Public Safety Center on Hackett Road. Future plans on the eastern side of Ceres would likely involve the City-owned property at the corner of Fowler and Boothe Roads.
- Anticipated needs for the law enforcement division include: upgrading the existing communication system, addition of Motorcycle Officers, K-9 Units, participation in Regional Airborne Law Enforcement, and Community Policing Stations in conjunction with future Fire Stations.
- Solid waste disposal in Ceres is provided by a franchise agreement with Bonzi Ceres Disposal. Under the franchise agreement over 8,000 residences are served with residential trash and curbside recycling collection services. Wastes are brought by the franchisee to the transfer station and checked for salvageable and hazardous materials prior to being sent to the waste-to-energy facility. Residuals from the waste-to-energy facility and non-transformable wastes are taken to the Fink Road Landfill. The current anticipated life of the landfill is 15 years. The city has also prepared a *Source Reduction and Recycling Element* to reduce overall wastes generated for disposal.
- The Frances C. and Florence L. Gondring Memorial Library, a branch of the Stanislaus County Library, is located at 2250 Magnolia Street. In 1993 the Gondring Library and one permanent employee and one part-time employee. The library has reduced its hours to 23 hours per week due to budgetary constraints. The library contains approximately 30,000 volumes and provided reference and information assistance for patrons. The library staff estimated that an additional 30,000 volumes are needed to handle the required demand to adequately serve the community.
- There are no acute health care facilities within the City of Ceres. Residents requiring major medical attention must use hospitals in Modesto. Ambulance service is provided from the Ceres Memorial Hospital to the acute care facilities in Modesto.

6.10 PERSONS CONSULTED

Chapman, John, Division Commander, City of Ceres Department of Public Safety

Davis, Dan, Battalion Chief, City of Ceres Department of Public Safety

Dunkel, Kay, Administrative Assistant, City of Ceres

Guillette, Len, Assistant Engineer, City of Ceres

Holstein, Joe, City Engineer, City of Ceres

Kirkpatrick, Eric, Transmission Engineer, Pacific Gas and Electric Company

Lawrence, Steve, Electrical Engineer, Turlock Irrigation District

Qualles, Kay, Librarian, Gondring Memorial Library

Rudd, Jack, Assistant Superintendent, Ceres Unified School District

Shanahan, Sharon, Administrative Services, Ceres Unified school District

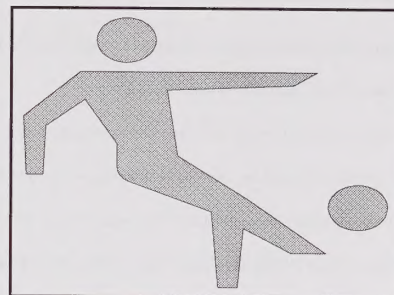
Silbernagel, Gil, Hospital Administrator, Ceres Memorial Hospital

Van Wagoner, Angie, Business Services, Ceres Unified school District

Weber, Brian, Police Division Commander, City of Ceres

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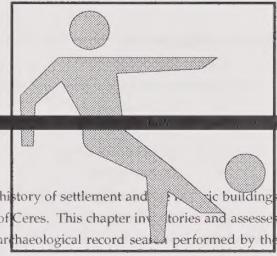
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CHAPTER 7

RECREATIONAL AND CULTURAL RESOURCES

CHAPTER 7 RECREATIONAL AND CULTURAL RESOURCES



7.0 INTRODUCTION

The City of Ceres has a variety of recreational and cultural resources. These resources take numerous forms, ranging from parks and open space, to the city's rich history of settlement and historic buildings that attest to the city's past. It is important that these resources are recognized and preserved, for the purposes of educating the public and retaining the character of Ceres. This chapter inventories and assesses the various recreational, historic, and archaeological resources in Ceres, and is based upon reviews of existing literature and cultural resource surveys, and an archaeological record search performed by the Central California Information Center.

7.1 PARKS AND RECREATION

Parks in Ceres are operated and maintained by the City. The City had 63 acres of parkland within the city limits as of 1993. Historically, the City had a policy of 5 acres of park per 1,000 residents; the City has also considered available Ceres Unified School District (CUSD) property to assist in meeting the demand for parks and athletic facilities; 72.5 acres of open space are found at existing schools. As of 1994, approximately 2.2 acres of City parkland per 1,000 city residents. If all the open space at schools is considered as available parkland, the city would have a ratio of 4.6 acres of open space per 1,000 population. School grounds, however, are frequently unavailable and are designed to meet school recreational needs. Ceres officials and residents describe unmet demand for park facilities in Ceres, particularly for active recreational needs (e.g., ball fields).

According to 1990 Census data, approximately 8,400 persons resided in the unincorporated sphere of influence around Ceres. A total of 20 acres of parkland are located outside the city limits within the Study Area. The lack of parkland in the unincorporated area around Ceres results in persons living in that area using Ceres City parks, exacerbating the lack of adequate park facilities in Ceres.

It has been the City's policy to locate park facilities adjacent to public school sites whenever possible to use the school open space. The City coordinates the park and recreational needs of the community with non-profit groups and the Ceres Unified School District (CUSD). The CUSD works with the City and other private non-profit organizations to provide for joint use of athletic facilities. CUSD facilities are heavily used and the district has difficulty providing adequate maintenance of the facilities given their high usage levels.

7.1.1 PARK CLASSIFICATIONS

The following paragraphs summarize the City's existing park classification system.

Neighborhood Parks: Neighborhood parks should fulfill recreation needs by providing playing fields, courts, picnic facilities, and playground apparatus. Neighborhood parks should be five to ten acres in size.

Community Parks: Community parks are where members of the entire community can congregate. The facilities include the typical neighborhood park facilities plus covered picnic areas, restrooms, and lighted softball fields and tennis courts. Community parks should be twenty to sixty acres in size.

Regional Parks: Regional parks are developed to serve more than one community. They should provide as many diverse recreational facilities as possible. They should also make use of the area's unique natural resources. Regional parks should be a minimum of fifty acres.

7.1.2 INVENTORY OF EXISTING PARK FACILITIES

Ceres City Parks

The City operates nine neighborhood parks and one community park, comprising a total of approximately 63 acres. Ceres' parks and their facilities are listed in Table 7-1; park locations are shown on Figure 7-1.

TABLE 7-1 EXISTING PARKS AND PARK FACILITIES IN CERES

Berry Grove Neighborhood Park	
Size: 3.99 acres	
Facilities:	
• Play Equipment	• Covered Picnic Gazebo
• Picnic Tables with Barbecue Grills	• 2 Lighted Tennis Courts
	• Lighted Baseball Court
	• Adult Fitness Equipment
	• Unstructured Ballfield
	• Restrooms
Don Pedro Neighborhood Park	
Size: 5.00 acres	
Facilities:	
• Play Equipment	
• Adult Fitness Equipment	
• Picnic Tables with Barbecue Grills	
Independence Neighborhood Park	
Size: 3.97 acres	
Facilities:	
• Play Equipment	
• Picnic Tables with Barbecue Grills	
Persephone Neighborhood Park	
Size: 3.38 acres	
Facilities:	
• Play Equipment	
• Picnic Tables with Barbecue Grills	
Roeding Heights Neighborhood Park	
Size: 6.30 acres	
Facilities:	
• Play Equipment	
• Picnic Tables with Barbecue Grills	

Smyrna Community Park

Size: 27.44 acres

Facilities:

- Play Equipment
- Picnic Tables with Barbecue Grills
- Covered Picnic Area
- Horseshoe Pits
- Lighted Softball Complex (4)
- Rose Garden
- Restrooms

Whitmore Park

Size: 1.55 acres

Facilities:

- Gazebo
- Group Picnic Area
- Picnic Tables with Barbecue Grills
- Restrooms

Redwood Neighborhood Park

Size: 1.37 acres

Facilities:

- Play Equipment
- Picnic Tables with Barbecue Grills

Westpointe Neighborhood Park

Size: 5.00 acres

Facilities:

- Play Equipment
- Picnic Tables with Barbecue Grills
- Unstructured Ballfield
- Gazebo
- Restrooms

Mancini Park

The City of Modesto owns and maintains the 20-acre Mancini Park, located south of the Tuolumne River east of Herndon Road, within the Study Area. Mancini Park includes ball fields, a playground, picnic area with barbecues, and hiking trails.

Tuolumne River Regional Park

The Tuolumne River Regional Park is a cooperative effort through a Joint Powers Agreement (JPA) between Ceres, Modesto, and Stanislaus County. The JPA has purchased approximately 600 acres for the park. Approximately 180 acres of the park is publicly-owned and developed. Funding for the park is through a ½ cent per \$100 of assessed value from both cities and the County. The plan is to develop a seven-mile long park along the Tuolumne River. Recreation facilities include sport complexes, picnic facilities, play areas, and a trail system. The City of Ceres has contracted for environmental and design services for the construction of a pedestrian/bike path bridge across the Tuolumne River to improve Ceres residents access to the park.

7.1.3 FUTURE PARK FACILITIES

The City has purchased a five-acre site for development of a new neighborhood park adjacent to the new Samuel Vaughn Elementary School. The City is also reserving funds for future development of a 40- to 80-acre community park.

7.1.4 RECREATIONAL PROGRAMS

The City of Ceres has active participation in adult and youth recreation programs. Table 7-2 describes the recreational programs and their participation in 1990 as reported by the Parks and Recreation Commission.

TABLE 7-2 RECREATIONAL PROGRAMS IN CERES 1996	
Program	Participants
Adult softball tournaments	200 per event
Adult softball (Ceres Adult Athletic Association)	484
Adult volleyball	150
Concerts in the Park	Up to 500 per event
Senior citizens (Ceres Senior Citizens Club)	220
Swim team (Ceres Dolphin Swim Team)	300 + opponents
Swim lessons/recreational swim (City of Ceres)	250 daily
Tennis Academy lessons	50
Youth baseball/softball (Ceres Youth Baseball)	1,300
Youth soccer (Ceres Youth Soccer Organization)	1,000
Youth football (Ceres Youth Football - Cowboys/Falcons)	100
Youth basketball (Ceres Youth Basketball)	250
Source: City of Ceres Management Services, 1996.	

Participation in Ceres recreational programs greatly exceeds the available facilities at City parks and school grounds.

7.1.5 COMMUNITY EVENTS

Several community events take place in Ceres throughout the year, attracting residents and visitors to Ceres. The three largest events are the Street Faire, the Western Art Festival, and Christmas Tree Lane.

Street Faire

The Street Faire takes place the first weekend during May. Streets are closed off for three blocks downtown during the Faire, which features arts and crafts, antiques, a car show, and various entertainment for children and adults. In 1994, approximately 40,000 to 50,000 people attended the Street Faire according to the Chamber of Commerce.

Western Art Festival

The Western Art Festival is held the first weekend of October. Western art by artists throughout the nation are displayed and sold at St. Jude's Church on Mitchell Road, with the funds raised for the Ceres High School scholarship fund.

Christmas Tree Lane

Christmas Tree Lane is an exhibition of homes along Henry and Vaughn Streets decorated with lights and Christmas decorations. Christmas Tree Lane opens the first Saturday in December and lasts through December 26th, and is considered one of the finest displays in the area.

7.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES**7.2.1 NATIVE AMERICANS**

The Study Area lies within the territory of the Yokuts tribe, who inhabited the Central Valley during historic times, in a territory which generally extended from the foothills of the coast range east to the foothills of the Sierra Nevada. The Yokuts were divided into 50 tribelets, based on linguistic variations, and primarily lived in large settlements along the banks of rivers and their tributaries.

The Yokuts used a number of dwelling types, including a mat-covered, gabled kawi, or communal dwelling; a wedge-shaped tule house, in which only one family lived; small, elliptical tule houses; conical, tule-covered dwellings that were placed in rows; and a bark house called a samish.

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A wide variety of foods were available to the Yokuts, who gathered many varieties of plants and seeds, in addition to hunting small game, fishing, and shellfishing. Where acorns were available, they served as a primary component of their subsistence.

The Yokuts maintained trade links with coastal villages where they traded furs and other materials for shells, such as abalone and clams. Shell disks and dentelium beads, as well as polished cylindrically-shaped magnesite rocks and bi-valves, were used as money.

Due to their rapid disappearance after European settlement, ethnographic data on the Yokuts is sparse.

7.2.2 HISTORIC SETTLEMENT OF CERES

This historical account of the settlement and development of Ceres is taken from a booklet entitled *A Historical Stroll*, written by Ruth Caswell Jorgensen and Caryl Davis Fowler in 1985.

The founder of Ceres, Daniel Whitmore, arrived in California in 1854, and in the Ceres area in 1867. Daniel and his family eventually acquired 9,000 acres, which included what was later to become the town site of Ceres. By 1875, the area had been surveyed by Daniel's brother R.K. Whitmore, and a map had been filed for the layout of the town. *A Historical Stroll* recounts Mrs. Whitmore's recollections of that year:

In the fall of 1867, Daniel Whitmore and family, consisting of a wife and three sons... and John Service and wife, moved on to these open plains, built houses and commenced the work of developing the country which at that time was considered only fit for herds of cattle and bands of horses which had roamed over the land undisturbed. In the course of the year following, other houses sprang up, and the first settlers soon found that these vast plains were being covered with something other than cattle and horses. The following winter plows were going in all directions turning over the hard red soil, and in a few months the pretty green grain covered the land, and a pioneer life had begun.

The words of John Service are also recounted, as they occur in the book *John Service, Pioneer*:

[T]he north side of the Tuolumne (sic) was pretty well settled, but there was no one living on the uplands south when we went down in 1867." There were some inhabitants on the river bottom land, but "no one thought that the uplands were good for anything but grazing." "The crop all through the Whitmore tract was so good that first winter (1867-1868) that Daniel Whitmore called the little settlement south of the Tuolumne 'Ceres' after the Greek Goddess of Agriculture.

The first home in Ceres was that of Daniel Whitmore and his family, which was built in 1870 and inhabited in 1871. This home is still standing, at 2928 Fifth Street, and is on the National Register of Historic Places. After the town was laid out, Daniel gave away alternate lots, with the stipulation that the owner build on it and occupy it, and uphold a temperance clause which was inserted into the deed. Ceres was apparently the only temperance town in the vicinity, and was thus set apart from other towns in the area. The first deed was given to two sisters, Mrs. Fellows and Mrs. Conner, who started the town's first boarding house. The next person to accept the offer was Mr. J.G. Annear, who built the town's first blacksmith shop.

In 1872, the railroad crossed the Tuolumne River into Ceres, and the town became a flag stop. A few years later, a depot was built, and Mr. Whitmore had petitioned for a post office. The town was named "Ceres" (the name Daniel Whitmore had used in commenting on the first wheat crops) by Elma Carter, one of the town's residents. The first store was built in 1873, followed by a schoolhouse in 1874, a public meeting hall in 1880, a "flouring mill" in 1881, and a Baptist church in 1882. Many people would move to Ceres in the years to come, and the economic infrastructure required to support them would also develop. Branch's *History of Stanislaus County* (1881) stated that "the town has made rapid progress during the last year...There are two warehouses—the largest being owned by Mr. Whitmore...It is only three miles from Modesto and in the midst of a vast grain-growing region." In the *History of the Counties* (1892) Ceres is referred to as "quite a business point, and contains all the facilities of a good agricultural town."

By the late 1800s, however, the end of the "grain era" and the necessity of irrigation was becoming evident. As *A Historical Stroll* states, "before the advent of irrigation, the Whitmores had a 30-acre experimental orchard embracing a variety of fruit and nut trees grown without water. Smaller vines, berries, and vegetables were watered by two windmills. With the knowledge that 'irrigation would make the plains a garden spot,' Whitmore proceeded to sell off 3,000 acres at \$30 to \$40 per acre." With the founding of the Modesto and Turlock Irrigation Districts, the population grew dramatically. By 1918, Ceres was an incorporated city with 1,000 residents. The city was generally considered to be prosperous at this time. Agricultural products included figs, peaches, grapes, pears, apricots, various berries, alfalfa, beans, melons, poultry, and dairy products.

7.2.3 HISTORIC SITES AND BUILDINGS

In addition to the Daniel Whitmore House, which is on the National Register of Historic Places, there are a number of structures in Ceres that are historically significant on a local scale. These include homes built in the early 1900s, churches, meeting halls, and other buildings and sites.

Table 7-3 lists the existing structures listed in *A Historical Stroll*, along with their locations, date of construction where available, and notes about their significance. In many cases, construction dates or other information is not listed. Figure 7-2 shows the locations of the sites listed in Table 7-3.

TABLE 7-3 SITES OF HISTORIC INTEREST

No.	Name	Location	Year Built	Notes
1	Site of Ceres Branch of the Modesto Lumberyard	SW corner of Hackett Street (formerly Creamery Road) and Railroad tracks	1903	Built by C.R. Tillson and managed by James Gartin
2	West home	NE corner of Hackett Avenue and West Street	1910	West Street named after original home owner
3	Asa Johnson home	2121 Hackett Avenue	1908	Johnson was Ceres' first constable
4	Harry Brown home and chicken hatchery	1844 Hackett Avenue	Early 1900s	N/A
5	James Gartin home	3405 Central Avenue	Early 1900s	N/A
6	Lenart Family home	3505 Central Avenue	Early 1900s	N/A
7	Mitchell Family home	3521 Central Avenue	Early 1900s	N/A
8	Turlock Irrigation District's first office	3020 Fourth Street	1905	TID building was later used as Ceres' first bank
9	First Interstate Bank building	SE corner of Lawrence and Fourth Streets	1917	Was constructed for the Bank of Ceres
10	I.O.O.F Hall	SW corner of Lawrence and Fourth Streets	Early 1920s	Former site of the T.C. Simon and Daughters Bakery and Confectionery store
11	Masonic Hall	SE corner of Third and North Streets	1908	Was original First Church of Christ-Christians; new church structure built in 1951 now located at SE corner of Third and Magnolia Streets
12	Allura Ulch's second home	NW corner of Lawrence and Sixth Streets	1903	Home was originally located at the NW corner of Fourth and Lawrence Streets. Ulch maintained the first library, post office, and a notions store there.
13	Joseph and Mary Vincent home	Fourth Street, north of Fourth Street	Early 1900s	The Vincents arrived in Ceres in 1904 and purchased the water works and blacksmith shop from Averill Bros. and Hall.

TABLE 7-3: SITES OF HISTORIC INTEREST

14	Averill home*	Openshaw and River Roads, north of Ceres	Early 1900s	Home was originally located on the east side of Fourth Street and Lawrence
15	Ceres Courier Building	2948 Fourth Street	1910	Built by Clarence Bronaugh
16	Baptist Church	NW corner of North and Fifth Streets	1900	Original building was dedicated in 1882 and destroyed by fire in 1899.
17	Parsonage	Adjacent to Baptist Church on Fourth Street	1907	N/A
18	John Andrew Wagener home	NW corner of Magnolia and Fourth Streets	1910s	Wagener was principal of the Ceres Grammar School from 1905 to 1920 and was responsible for establishing the first high school in Ceres
19	A. J. Blaker home	NE corner of Magnolia and Fourth Streets	1912	N/A
20	Vaughn Whitmore home	Whitmore Avenue between Fourth and Fifth	Not listed	Vaughn Whitmore was grandson of Ceres' founder, Daniel Whitmore, and was Ceres' first elected mayor and a Stanislaus County supervisor for 24 years
21	Cook family home	2321 Whitmore Avenue	1902	
22	Lawrence Whitmore's first home	2538 Fifth Street	1909	Lawrence Whitmore was a grandson of Daniel Whitmore; Lawrence Whitmore was Ceres Justice of the Peace and had a real estate and insurance license
23	Leslie Whitmore's first home	2719 Fifth Street	1903	Leslie Whitmore was also a grandson of Daniel Whitmore and was a businessman
24	Clinton Whitmore mansion	2732 Fifth Street	1903	Clinton Whitmore was the son of Daniel Whitmore
25	Dr. S. W. Cartwright home	2905 Fifth Street	1916	Home was later occupied by Walter White, longtime elementary school superintendent
26	Original hospital building	1913 Fifth Street	Not listed	Dr. S. W. Cartwright had the building constructed as Ceres' first hospital
27	Daniel Whitmore home	2928 Fifth Street	1870	First home built in Ceres. Daniel Whitmore, the town's founder, was Ceres' first postmaster, servicing for 19 years. The home housed Ceres' first post office. Listed on the National Register of Historic Places
28	Myrtle and Will Ham's home	2937 Fifth Street	Not listed	Will Ham came to Ceres in 1910; he ran a grocery store, and was constable for 20 years. Myrtle Ham's family came to Ceres in 1902 and her father, C.F. Baldridge, was superintendent of Whitmore's experimental fruit farm called "The Garden."
29	Will Ham's mother's home	Not listed	Not listed	N/A
30	Conner-Fellows Boardinghouse	Not listed	Not listed	The two sisters were the first to accept Daniel Whitmore's offer of a free lot with the temperance clause inserted in the deed
31	W.C. Pendergrass home	3015 Fifth Street	Not listed	Early day doctor
32, 33	Name not listed	3037 and 3039 Eighth Street	Not listed	Material from the old Ceres Hotel, torn down in the early 1920s, was used in the construction of these homes
34	Peckham house	2548 Roeding Road	1906	Built by Charles and Halsey Peckham. This and 2604 Roeding Road were the first homes in this section of town and were surrounded by wheat fields
35	Peckham house	2604 Roeding Road	1906	See above
36	Rev. Helsley home	2468 Roeding Road	Not listed	Helsley was an early minister of the Baptist Church. He came to Ceres in 1899
37	A.J. Roberts home	2548 Roeding Road	Not listed	N/A
38	Elmo Warner home	Southeast corner of Sixth Avenue	Not listed	N/A
39	Parish Hall	Northwest corner of Park and Sixth Streets	1908	Originally part of Congregational Church
40	Parsonage	3026 Fifth Street	Not listed	Original owner was Daniel Campin, Ceres first justice of the peace
41	Methodist Church	Southwest corner of Sixth and Lawrence Streets	1907	Church bell, cast in Philadelphia in 1888, was brought from the Congregational Church when it merged with Methodist Church in 1934.
42	Clinton Whitmore School	North side of Lawrence east of Sixth Street	1930	N/A
43	Moffet home (now Larson's Western Wear)*	Mitchell Road, south of Whitmore Avenue	1919	Building was originally located at the northwest corner of Moffet Road and Whitmore Avenue. The previous site as a ranch and home site.
44	Reverend E. Chute home*	1538 Moffet Road	1907	Reverend Chute was a missionary to India.

* Not shown on Figure 7-2

Source: Fowler, Cary, and Ruth Jorgensen, *A Historical Stroll, Ceres, California*, 1985.

7.2.4 ARCHAEOLOGICAL RESOURCES

The Central California Information Center of the California Archaeological Inventory completed a record search of the Ceres General Plan Study Area in December 1993. Results of the search revealed that there are no recorded archaeological sites in the Study Area. There have been 12 cultural resource surveys conducted in the Study Area, the largest of which is the West Ceres Annexation Area. All of the surveys had negative results. Given the small number of surveys performed in the Study Area, however, it is difficult to assess the cultural resource potential.

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Areas that are considered sensitive, or likely to contain archaeological or historic resources, are often located near watercourses, springs, ponds, and on elevated ground. Many archaeological sites in the Central Valley have been buried by silt and might not be evident during surface surveys. Furthermore, the channels of natural watercourses change over the years, and water bodies dry up; therefore, archaeological sites may be found in areas that are distant from present sources of water. To date, only one survey has been performed along the Tuolumne River within Ceres, and this was only a small survey area. The potential for the presence of cultural resources along the Tuolumne River's stretch through Ceres has been largely unexamined.

7.3 FINDINGS

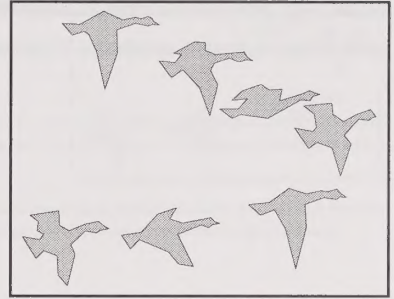
- The City operates nine neighborhood parks and one community park comprising approximately 63 acres.
- The City of Ceres has active participation in adult and youth recreation programs, particularly in youth baseball/softball and youth soccer programs. Participation in Ceres recreational programs greatly exceeds the available facilities at City parks and school grounds.
- Three major community events take place each year in Ceres: the Street Faire, Western Art Festival, and Christmas Tree Lane.
- Information on Ceres' prehistory is scarce; the area was once the territory of the Yokuts Indians. Most of the Study Area has not been surveyed for the existence of archaeological resources.
- Ceres contains many historic homes and structures. The Daniel Whitmore House, the former home of the town's founder, is listed on the National Register of Historic Places.

7.4 BIBLIOGRAPHY

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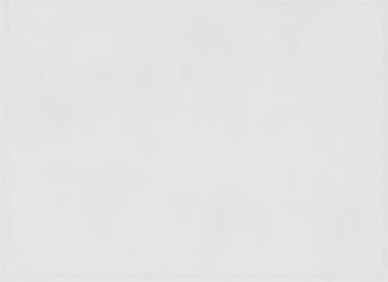
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CHAPTER 8

NATURAL AND AGRICULTURAL RESOURCES



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CHAPTER 8 NATURAL AND AGRICULTURAL RESOURCES

8.0 INTRODUCTION

The economy of the city of Ceres, like most of Stanislaus County, depends to a very large extent upon its agricultural resources. The gross agricultural income for Stanislaus County was an all-time record in 1992. Soil and water resources are vital to the continued growth of this agricultural industry in the County and within the Ceres General Plan Study Area. Urbanization into the outlying areas of the Study Area is expected to continue and protection of natural resources is, therefore, important to maintain the quality of life in and around the city of Ceres.

This chapter compiles and summarizes information pertinent to the natural and agricultural resources of the Study Area. It represents a compilation of existing published information on resources of the Study Area combined with reconnaissance-level field surveys. The information presented in this chapter includes hydrology, soils, agriculture, biotic habitats, special-status plants and animals, and air resources.

8.1 WATER RESOURCES

8.1.1 REGIONAL HYDROLOGY

The Ceres Study Area occurs on the alluvial plain within the Tuolumne River watershed in Stanislaus County. Extending from its eastern boundary along the crest of the Sierra Nevada to its confluence with the San Joaquin River, roughly 10 miles west of the Study Area, the Tuolumne River watershed encompasses an area of 1,900 square miles. Elevations in the watershed range from approximately 12,000 feet, national geodetic vertical datum (NGVD) in the Mt. Lyell glacier in Yosemite National Park to 10 inches at the San Joaquin River confluence (DWR 1981). Figure 8-1 is a watershed location and hydrologic features map of the Tuolumne River watershed. Previous studies of the Tuolumne River watershed and its hydrologic conditions (Brown and Caldwell Engineers 1989, 1990, 1992) have implicitly assumed that the surface water and groundwater basin boundaries are coincident, (i.e., that the subsurface geology corresponds to the watershed boundaries).

Land use in the upper Tuolumne River watershed includes timber harvesting, mining, livestock grazing, resorts and recreational facilities. The Tuolumne's upper watershed is primarily wilderness land. In the middle and lower reaches of the watershed, agriculture and related commercial facilities comprise a large portion of the economic activity and land use. Larger industrial and more extensive commercial and retail land uses occur in Modesto and to a lesser degree in the smaller cities and towns along the State Route 99 corridor.

Precipitation in the Tuolumne River watershed occurs as snow or rainfall depending on the local land elevations and on the orographic effects induced by the presence of the Sierra Nevada Mountains. Mean annual precipitation in the watershed ranges from 37 inches in Yosemite Park to 10 inches at the San Joaquin River confluence (DWR 1981). The bulk of the total precipitation occurs during the winter season, which extends from October to April. Infrequent summer thunderstorms provide the remainder of the precipitation.

Flow in the Tuolumne River is regulated by upstream reservoirs, including Hetch Hetchy, Lake Eleanor, Cherry Lake and Don Pedro reservoirs. Consequently, river flows vary significantly from month to month and year to year. Monthly average and median flows for the Tuolumne River at La Grange (upstream of the Study Area) and Modesto for the period 1971 to 1990 are presented in Figure 8-2. The median annual flow represents the mid-point of all the recorded daily flows, (i.e., 50 percent of the recorded flows lie both above and below this flow). This measure of river flow eliminates the disproportionate effects of the few extreme high-flow events on record. Note also that the increased discharge recorded at Modesto is due to groundwater accretion and agricultural return flows.

Flooding on the Tuolumne River occurs primarily toward its outlet in the San Joaquin River. Floodplains in the incised middle and upper reaches of the Tuolumne River watershed are narrow, confined by steep canyon sides. Downstream along the lower reach of the Tuolumne, and particularly on the San Joaquin River, an extensive network of flood control levees can fail during severe floods, resulting in inundation of the historical river floodplain.

Such events only occur in response to infrequent, severe periods of precipitation and/or snowmelt which trigger more watershed runoff than the upstream reservoir system can contain. Subsequent unregulated reservoir releases result in high river flows downstream in the watershed and a heightened risk of flooding. Unregulated flash flooding on Dry Creek, which joins the Tuolumne downstream of the Study Area in the city of Modesto, can also contribute to the severity of downstream flooding.

Although the risk is low, the Tuolumne River canyon could be subjected to catastrophic flooding in the event of one or a series of dam failures in the upper basin. Failure of one of the dams further up in the watershed would likely trigger a sequence of failures at other structures downstream. If such a series of events were to occur, widespread flooding would be experienced along the middle and lower reaches of the river. Projections of flood boundaries associated with upstream dam failures indicate that only limited flooding would occur in the northernmost part of the Study Area as a result of failure of the dam at Don Pedro reservoir, similar to that which would be experienced in a 100-year flood event.

8.1.2 REGIONAL GROUNDWATER HYDROLOGY

The regional groundwater basin that underlies the Tuolumne River valley and the Study Area varies from 5,000 to 13,000 ft. in depth. Water bearing characteristics within the basin are strongly influenced by the presence of a 20 to 100 foot thick clay layer, known as the Corcoran clay, which underlies the western two-thirds of the valley alluvium and partially confines the lower aquifers. Figure 8-3 depicts an east-west oriented cross-section through the regional groundwater basin showing its principal hydrogeologic features (Brown and Caldwell 1992).

Three regional groundwater aquifers underlie the Study Area: 1) an unconfined shallow freshwater aquifer in the alluvium above the Corcoran clay; 2) a partially confined freshwater aquifer in the alluvium below the Corcoran clay; and 3) partially confined, saline groundwater in the marine sediments and rocks beneath the freshwater. Toward the eastern edge of the valley, the clay lens pinches out and leaves a single unconfined freshwater aquifer in the alluvium. The fresh groundwater, extending to depths of -400 to -700 feet NGVD, provides all of the municipal drinking water supplies within the basin, including the Study Area.

As shown in Figure 8-3, municipal, industrial and agricultural users constitute the pumped withdrawal of groundwater from the regional groundwater system, while agricultural irrigation is the principal source of groundwater recharge. The imbalance between the two currently results in an average net groundwater depletion of 72,500 acre-feet annually (ac.-ft./yr.). With the exception of the Turlock Irrigation District (TID), all of the water users in the basin, including cities, private agricultural users and local water districts withdraw more water from the basin than they recharge. TID relies on a conjunctive supply of imported Tuolumne River water (80 percent) and pumped groundwater (20 percent). This is the primary reason that it is the only net contributor to the regional groundwater supply. Other sources of recharge include seepage from Turlock Lake, subsurface flow from the Sierra foothills and percolated rainfall, all of which are proportionately minor (Brown and Caldwell 1990).

Currently, the most significant groundwater depression in the area underlies the agricultural area east of the TID service area. Over the last 18 years, the water table in this area has fallen 40 feet. Computer simulations conducted by Hydrologic Consultants, Inc. (HCI; Brown and Caldwell 1989), assuming a continuation of present water use trends, predicted that an additional 20 ft. of drawdown would occur in this high use area by the year 2020. Additional simulations performed for the HCI study predicted that groundwater levels in the metropolitan areas along the Route 99 corridor would also undergo severe aquifer depletion during the next 25 years. The regional groundwater overdraft has prompted the current progress toward an expansion of the surface water supply for the City of Ceres and other water users in the TID and MID (Modesto Irrigation District) service areas. This program is discussed further in the following sections.

Regional Groundwater Quality

Groundwater quality in the regional groundwater basin has been deteriorating at an accelerating pace over the past two decades. Agricultural irrigation is responsible for the bulk of the groundwater recharge into the regional aquifers. Pesticides and other chemical agents applied during the irrigation process contaminate the recharged groundwater and degrade the quality of the resource. Salts leached from the soils during the irrigation process also enter the groundwater. These influences on groundwater quality are responsible for the urban utility well "failures" that have occurred during the recent past. Since the partially confining Corcoran clay is not impermeable, these contaminants can penetrate it and reach the middle aquifers from which the municipal water supplies are drawn. The lower aquifer is saline, limiting its use for

domestic and agricultural purposes. Abandoned or improperly sealed wells and use of stormwater drainage wells also allow poor water quality to enter aquifers. Recent studies have shown that both nitrate and DBCP (dibromochloropropane, a soil fumigant) levels in area wells have been steadily increasing.

As federal water quality regulations become more stringent, well failures due to groundwater degradation will increase. Brown and Caldwell (1992) found that of the 64 existing water supply wells in the TID service area, including the Study Area, 13 wells exhibited water quality problems during the 1989 to 1991 monitoring period. Out of 10 wells that were abandoned during this period, seven were abandoned for water quality reasons. For the Study Area, this translated into a well failure rate of ten percent, compared to a three percent failure rate during the 1980-1989 period. One important reason for this increased failure rate was the federally-mandated threshold concentration (referred to as the maximum containment level, or MCL) for DBCP, which in July 1989 was reduced from 1.0 microgram per liter to 0.2 micrograms per liter.

Other groundwater contaminants that are becoming increasingly problematic for local water suppliers include TDS (total dissolved solids), which is one measure of salinity; radon and other radionuclides; and miscellaneous organic chemicals. Table 8-1 lists the average nitrate and TDS levels measured at municipal wells in the TID service area. Figure 8-4 shows the number and percentage of wells monitored during the period 1985-1989 which exceeded or nearly exceeded the current MCL for DBCP, nitrate and gross alpha radionuclides. The high proportion of wells failing to meet the radionuclide standard is a function of the more stringent, mandated thresholds for drinking water, as well as potentially increasing levels of contamination.

TABLE 8-1* SUMMARY OF GROUNDWATER QUALITY DATA		
Well Location	Average Nitrate Level, mg/l	Average TDS Level, mg/l
City of Ceres	26	417
Del Este Water Company	32	369
Delhi County Water District	30	214
Denair Community Services District	27	175
Hillmar County Water District	38	336
City of Hughson	33	343
Keyes Community Services District	34	209
City of Modesto, south	39	451
City of Turlock	17	208
TDS, Total Dissolved Solids		
*The water quality objective for nitrate is 34 mg/l; the water quality objective for TDS is 350 mg/l.		

8.1.3 REGIONAL WATER SUPPLY DEVELOPMENT

As noted earlier, all of the drinking water supplies in the region are derived from groundwater. Irrigation water for the region's agricultural users is delivered via the TID canal system. The canal system is fed by Tuolumne River water which is diverted from the storage reservoir at La Grange Dam, located approximately 25 miles upstream of Ceres.

Figure 8-5 shows the alignments of the network of canals and laterals that deliver the diverted surface water throughout the TID service area. Turlock Lake, fed by the TID Main Canal from the La Grange diversion, is located between the communities of La Grange and Hickman and serves as a regulating reservoir for the TID canal system. From the Turlock Lake outlet, the Main Canal continues westward to Hickman, where it splits, and the Turlock Main Canal flows southward, while the Ceres Main Canal flows westward. The main canals feed a network of laterals and ditches within the TID service area that extend west to the San Joaquin River and south to the Merced River. The flow capacity of the system varies. Upstream of Turlock Lake, the Main Canal has a capacity of 3,500 cubic feet per second (cfs). At the outlet of Turlock Lake, the canal has a capacity of 2,100 cfs.

The canal system consists of lined and unlined trapezoidal open channels with varying dimensions and slopes. Flow in the canals is seasonal and fluctuates with irrigation demands, evaporation and seepage losses and spills. Winter irrigation demands are low due to increased rainfall, lower evaporation rates and dormant crops. Thus, the canal system is typically shut down for maintenance during the winter months (EIP 1992).

TID Surface Water Delivery System

In 1978, the Cities of Ceres and Modesto commissioned the U.S. Geological Survey to conduct a study of the regional groundwater basin (U.S. Dept. of Interior 1988). This was followed by *The Modesto-Ceres Area Water Management Study* (J. Montgomery Engineers 1984) and the three-phased study by Brown and Caldwell (1988-1992) on the water supply potential in the areas served by the TID.

Three alternatives were identified in the Brown and Caldwell documents which were then evaluated in the project EIR by EIP Associates in 1992. The EIR clearly rejected the status quo (No Project) alternative: continued reliance on groundwater for the region's drinking water supply. The other two alternatives were: Alternative A) a diversion of the Tuolumne River at Ceres; and Alternative B) the Turlock Lake Diversion. Both of these alternatives would allow the participating cities and local water companies to phase in surface water as the principal drinking water supply source. This would not only ensure a higher quality supply for urban consumption, but would reduce the impact of continuing groundwater pumping on the regional groundwater basin. The Ceres Alternative had the added benefit of improving the quantity and quality of streamflow in the Tuolumne River upstream of Ceres.

A Joint Powers Authority was formed by the potential beneficiaries of the proposed water supply diversion. This authority includes the Cities of Ceres, Hughson, Turlock and Modesto, the Del Este Water Company, the Delhi County Water District, the Denair Community Services District, the Hillmar County Water District, and the Keyes Community Services District. The TID would act as the water purveyor since it owns the water rights. According to City public works officials (Wilson, pers. comm. 1994), the preferred alternative was the Ceres Diversion.

Implementation of the Ceres Diversion entails the release of additional water from the La Grange Dam, located upstream at La Grange and the construction of one or more intake structures in the Tuolumne River between Boothe and Parks Roads. A Ranney Collector is the preferred type of intake structure, since it would not require construction in the river and would have the least effect on fisheries and wildlife. As of early 1994, testing was underway to determine the engineering feasibility of the collector. Other possible diversion/intake options include an infiltration gallery and instream fixed dams. The environmental impact of the collector and infiltration gallery methods would be much less than that of either of the fixed dam options. Assuming the project is proven technically feasible, the newly developed surface water supplies should be brought on-line sometime in the near future.

TID System Water Quality

The quality of water presently conveyed by the TID canal system is generally excellent. Several principal water quality constituents were monitored during the Brown and Caldwell Turlock Area Drinking Water Supply Study (1989-1992). Sampling of these selected constituents conducted in 1990 and 1992 is summarized in Table 8-2. As the data show, TID canal system water easily satisfies existing water quality objectives, as promulgated by federal and state regulatory agencies. Moreover, chloride, nitrate, TDS, radionuclides and DBCP concentrations in the Tuolumne River at the potential project diversion locations at Ceres and Turlock Lake are also within acceptable ranges. Only the trihalomethane formation potential (THMFP), turbidity and coliform concentrations significantly exceed the listed drinking water objectives set for the source waters in the study.

Elevated THMFP concentrations are thought to be the result of higher algal concentrations downstream of Greer Road, which in turn are caused by increased nitrate discharge in groundwater accretion and irrigation return flow. However, standard water treatment processes can provide effective removal of all three of the contaminants that exceed the drinking water objective concentrations at the diversion sites. A water treatment facility designed to perform this function is planned for the undeveloped area north of Hatch Road at Faith Home Road.

In contrast, area groundwater exhibits concentrations well above the current drinking water objective levels and in some cases even exceed the listed MCL's. The diverted water entering the TID distribution system at Turlock Lake benefits from the near quiescent conditions which favor deposition of incoming sediments and lower turbidity levels.

Factors	MCL	Drinking Water Objective	Turlock Lake	Ceres Diversion	Groundwater	TID Canal System
Chloride, mg/l	250	150	<0.5-2	16-31	6-270	1-2
Hardness, mg/l	-	150	12-21	12-15	138-290	-
Nitrate, mg/l as N	45	34	<0.02-0.61	<0.02-1.8	10-62	<1
TDS, mg/l	500	350	23-36	131-199	113-588	31-48
Gross Alpha, pC/l	15	11	0	0	0.1-38.6	0
DBCP, ug/l	0.2	0.15	0	0	0-2.1	0
THMFP, ug/l	100	50	53-472	51-655	N/A	38-66
TDS, Total Dissolved Solids DBCP, dibromochloropropane THMFP, trihalomethane formation potential N/A, Not Applicable Source: Brown and Caldwell, 1990 and 1992						

8.1.4 STUDY AREA HYDROLOGY, WATER SUPPLY AND WATER QUALITY

The Study Area comprises four, self-contained sub-watersheds that drain to small stormwater detention basins sited in parks and greenbelts throughout the area. Watershed land slopes are gentle, on the order of five feet per mile. Currently, the stormwater discharge from these basins reaches the TID laterals, Ceres Main Canal and the Tuolumne River via gravity or pump station/force main outfalls. There is no citywide storm drainage system for the evacuation of stormwater. In addition to the stormwater detention basins, numerous percolation/evaporation basins exist, although they are largely confined to industrial sites (Vail Engineering Corp. 1990). More detailed discussion of the Study Area stormwater drainage system is presented in Chapter 6, *Public Facilities and Services*.

Figure 9-2 in Chapter 9, *Safety*, delineates the FEMA-designated 100-year floodplain boundaries. Only small portions of the Study Area, primarily in the northern area immediately adjacent to and south of the river, would be subject to minor inundation during the 100-year flood. Otherwise minor flooding in the Study Area would occur only in the event of pump failure at one of the regional detention basin sites.

The City of Ceres has nine water supply wells within the Study Area boundaries, seven of which are operating. Well locations are shown in Figure 8-6. Well depths range from 100 to 400 feet below the ground surface. Demand for water varies significantly depending on the season, so only one or two of the wells may be used during the winter months, while during the summer months the full capacity of the system is utilized. Of the 2.2 billion gallons of water consumed annually, only 1.1 billion gallons are returned to wastewater treatment systems; the remainder is consumed in lawn irrigation, industrial processes or other activities.

New groundwater supplies are becoming increasingly difficult to develop. The City drilled a new well at Central Avenue in 1990. Initial testing of the well water indicated borderline levels of manganese. Further development of the well failed to improve this poor quality, so wellhead treatment will be required if the water is to be used as a potable supply. Future groundwater development is unlikely in anticipation of the availability of new surface water supplies from the Tuolumne River diversion (Wilson, pers. comm. 1994).

The City is currently instituting a policy which mandates the construction of on-site wells to irrigate large landscaped areas. When the new Tuolumne River surface water supply becomes available later in this decade, it is anticipated to be relied on solely for drinking water (Wilson, pers. comm. 1994).

8.2 SOIL RESOURCES

Soils information for the eastern Stanislaus County area, which includes the Study Area, was compiled during preparation of a Soil Conservation Service (SCS) soil survey report published in 1964. An updated soil survey report is expected to be available around the year 2000; field surveys for this report are scheduled to commence in the next 2-3 years (pers. comm. Keith Azevedo). The description and classification of soils, presented below, provides guidance in evaluating the suitability and limitations of soils for agricultural purposes and other land uses. It identifies lands best suited for agricultural use and presents some soil test data. This information includes identification of soil phases within the Study Area, land capability classification, Storie index ratings, soil series descriptions and a list of hydric soils.

8.2.1 SOIL SERIES DESCRIPTIONS

Nine different soil series occur within the Study Area (see Table 8-3). These series include Delhi, Dello, Dinuba, Grangeville, Greenfield, Hanford, Riverwash, Terrace and Tujunga. Expanded descriptions of each of these soils were obtained from the *Soil Survey for Eastern Stanislaus Area, California* (SCS 1964). This information is presented below. Each of the soil phases within a series is described in Table 8-3. A soils map for the entire Study Area is presented in Figure 8-7. Soils occurring within the Study Area are generally moderately coarse-textured and are developed from alluvium of granitic rocks; they are typically sands and sandy loams with nearly level (0-1 percent slopes) to moderately gentle grades (up to 3-8 percent).

Delhi Series. The Delhi series consists of somewhat excessively to excessively-drained, coarse-textured soils. These soils developed by wind from sand reworked from granite alluvium. They are on gently undulating and, in places, slightly hummocky relief. These soils are in the vicinity of Turlock and in scattered areas just south of the Stanislaus and Tuolumne River bottom lands. They are associated with the

Dinuba and Hilmar soils. The Delhi soils are at elevations of 50 to 100 feet in a sub-humid climate that has a mean annual precipitation of 10 to 13 inches. These soils are important for growing melons, alfalfa, sweet potatoes, almonds, peaches, and grapes.

Dello Series. The soils of the Dello series are imperfectly to very poorly-drained and coarse-textured. These sands developed in blowouts and depressions in areas of Delhi soils, by wind from sand reworked by granite alluvium. The Dello soils are at elevations of 50 to 100 feet in a subhumid climate that has a mean annual precipitation of 10 to 13 inches. These soils are too wet for cultivated crops. They are used mainly for pasture.

Dinuba Series. The soils of the Dinuba series are imperfectly-drained and moderately coarse-textured. They developed from alluvium derived from granitic rock. They are on young alluvial fans and have very gently sloping to nearly level, smooth relief. These soils are affected by salts and alkali in places. In areas that are not cultivated, the vegetation consists of annual grasses, herbaceous plants, and in some places, saltgrass, spikeweed, and other salt-tolerant plants. These soils are associated with the Hanford, Hilmar, and Fresno soils. Dinuba soils are at elevations of 50 to 150 feet in a semiarid climate that has a mean annual precipitation of 10 to 12 inches. These soils are largely cultivated. They are used mainly for irrigated pasture, grain, and vine crops.

Grangeville Series. The Grangeville series is made up of imperfectly-drained, medium and moderately coarse-textured soils. These soils developed from recently deposited alluvium derived mainly from granitic rocks and some metamorphic rocks. They are in areas having nearly level relief, but there are some channels and oxbow depressions. These soils are along the bottom lands and on the lower fans of the Stanislaus and Tuolumne Rivers. They are associated with the Hanford, Tujunga, and Foster soils. The Grangeville soils are at elevations of 40 to 100 feet in a subhumid climate that has a mean annual precipitation of 10 to 15 inches. These soils are used for walnuts, tomatoes and other truck crops, alfalfa, and irrigated pasture.

Greenfield Series. The soils of the Greenfield series are well-drained and moderately coarse-textured. They developed from alluvium derived from granitic rocks. They are on nearly level to gently sloping, low alluvial terraces. These soils are on benches along the Tuolumne River and along Dry Creek West of Hazel Dean Avenue. They are associated with the Hanford and Snelling soils. The Greenfield soils are at elevations of 100 to 250 feet in a subhumid climate that has a mean annual precipitation of 12 to 14 inches. These soils are used for orchards, vineyards, and field crops.

Hanford Series. The Hanford series consists of well-drained, moderately coarse-textured soils. These soils developed from alluvium derived from granitic rocks. They have smooth, very gentle slopes and are on broad, young and recent alluvial fans and alluvial terraces. The Hanford soils are along the Stanislaus and Tuolumne Rivers and on broad fans in the vicinity of Salida, Modesto, Hughson, Ceres, and Empire. They are associated with the Tujunga, Grangeville, and Dinuba soils. These soils are at elevations of 40 to 150 feet in a subhumid climate that has a mean annual precipitation of 10 to 14 inches. These are important soils for the production of a wide variety of irrigated orchard, field, and truck crops.

Riverwash. Riverwash consists of sandy areas adjacent to streams. These areas include dry riverbeds, stream channels, and sandbars of the Tuolumne River and are subject to periodic flooding. Sand and gravel pits are generally in areas of this material. Riverwash has no agricultural value except for very limited grazing or browse.

Terrace Escarpments. This miscellaneous land type consists of outcrops of soft and weakly consolidated sandy or silty sediments and a little soil material in places. Terrace escarpments are generally steep and subject to gully erosion. They occur on either side of the bottom lands of the Stanislaus and Tuolumne Rivers. They are sometimes used for grazing. If they are grazed heavily, gullies form and may cut into the farmland on the terraces above, and sand may be deposited on the fertile soils of the flood plains below.

Tujunga Series. The soils of the Tujunga series are somewhat excessively to excessively-drained and coarse-textured. They developed from very recent alluvial deposits derived from granitic rocks. They are on nearly level to gently sloping alluvial fans and flooded bottom lands. These soils are on the bottom lands and fans of the Stanislaus and Tuolumne Rivers. They are associated with the Grangeville, Hanford, and Foster soils. The Tujunga soils are at elevations of 35 to 100 feet in a subhumid climate that has a mean annual precipitation of 10 to 15 inches. These soils are used mainly for range pasture. In many places they interfere with the irrigation of intensively managed crops on the finer-textured soils with which they are associated.

TABLE 8-3
IDENTIFICATION AND CHARACTERIZATION OF SOILS OCCURRING
WITHIN THE CERES GENERAL PLAN STUDY AREA

Soil Series	Soil Symbol	Soil Phase Name	Soil Index Rating	Land Capability Classification	Hydric Soils	Hydric Landform	*Prime Farmland Soils	**Farmland of Statewide Importance
Delhi	DeB	Delhi loamy sand, 3-8% slopes	61	Ille-4	No		Yes	No
	DgA	Delhi loamy sand, silty substratum, 0-3% slopes	73	Ille-4	No		Yes	No
Dello	DkA	Dello loamy sand, 0-1% slopes	64	IVw-4	Yes	Depression	No	Yes
Dinuba	DmA	Dinuba fine sandy loam, 0-1% slopes	81	IIw-3	No		Yes	No
	DrA	Dinuba sandy loam, 0-1% slopes	77	IIw-3	No		Yes	No
	DaA	Dinuba sandy loam, shallow, 0-1% slopes	43	IVs-3	No		No	No
	DtA	Dinuba sandy loam, deep, 0-1% slopes	81	IIw-3	No		Yes	No
	DuA	Dinuba sandy loam, poorly drained variant, 0-1% slopes	68	IIIw-3	Yes	Depression	No	Yes
	DwA	Dinuba sandy loam, slightly saline-alkali, 0-1% slopes	60	IIw-3	No		***Yes	No
	DzA	Dinuba sandy loam, very poorly drained variant, slightly saline-alkali, 0-1% slopes	12	IIIw-6	Yes	Depression	No	No
Grangeville	GfA	Grangeville fine sandy loam, 0-1% slopes	85	IIw-2	No		Yes	No
	GmA	Grangeville very fine sandy loam, 0-1% slopes	85	IIw-2	No		Yes	No
Greenfield	CeA	Greenfield sandy loam, 0-3% slopes	90	I-1	No		Yes	No
Hanford	HbA	Hanford fine sandy loam, 0-3% slopes	100	I-1	No		Yes	No
	HbpA	Hanford fine sandy loam, moderately deep over silt, 0-1% slopes	95	I-1	No		Yes	No
	HdA	Hanford sandy loam, 0-3% slopes	95	I-1	No		Yes	No
	HdB	Hanford sandy loam, 3-8% slopes	90	IIe-1	No		Yes	No
	HddA	Hanford sandy loam, poorly drained variant, 0-1% slopes	76	IIw-2	Yes	Depression	Yes	No
	HdmA	Hanford sandy loam, moderately deep over sand, 0-3% slopes	73	IIIa-4	No		Yes	No
	HdpA	Hanford sandy loam, moderately deep over silt, 0-1% slopes	90	IIb-3	No		Yes	No
	HdsA	Hanford sandy loam, deep over silt, 0-1% slopes	95	I-1	No		Yes	No
	HeA	Hanford very fine sandy loam, 0-1% slopes	90	I-1	No		Yes	No

Riverwash	Rr	Riverwash	<5	VIIIa-1	Yes	Drainageways	No	No
Terrace	Tx	Terrace escarpments	<5	VIIIb-1	No		No	No
Tujunga	TuA	Tujunga loamy sand, 0-3% slopes	76	IIIc-4	No		Yes	No
	TvA	Tujunga sand, 0-3% slopes	43	IVe-4	No		No	Yes

*These soil mapping units meet the criteria for Prime Farmland as outlined in the U.S. Department of Agriculture's Land Inventory and Monitoring (LIM) project for the eastern Stanislaus area soil survey.

**These soil mapping units meet the criteria for Farmland of Statewide Importance as outlined in the U.S. D.A.'s LIM project for the eastern Stanislaus area soil survey.

***This unit is prime if reclaimed such that the electrical conductivity is less than 4 munhos/cm.

8.2.2 STORIE INDEX RATING

The Storie index ratings provide a comparative evaluation of the general suitability of the soils for agriculture. They are based on four factors that represent the inherent characteristics and qualities of the soils. Each factor is rated or evaluated separately in terms of percentage of the ideal, or 100 percent (SCS 1964). The Storie index rating for each of the soil phases which occur within the Study Area is presented in Table 8-3. Most of these soils have a Storie index rating between 60 and 100 percent. Soils in this range are considered suitable for a fairly wide range of agricultural crops and have few special management needs. Two of the soil phases (riverwash and terrace escarpments) have Storie index ratings of less than 10 percent. Soils of this class are generally nonagricultural (Table 8-3). An explanation of each of the factors used to determine the Storie index rating is presented below:

Factor A--Profile Characteristics. Factor A expresses relative favorability of the profile to the growth of plant roots. Soils that have a deep, friable profile are rated 100 percent. Soils that have a dense clay layer or a hardpan or are shallow over bedrock are rated less than 100 percent. The rating depends upon the extent to which root penetration is limited.

Factor B--Texture of the Surface Soil. Factor B is rated according to the texture of the surface soil, which is important in determining how easily the soil can be worked and how easily crops can be established. The moderately coarse and medium textured soils (fine sandy loam, loam and silt loam) are the most favorable and are rated as 100 percent. The coarser and finer textures are rated less than 100 percent.

Factor C--Slope. Factor C is particularly important if the soil is irrigated. Smooth, very gently sloping soils are rated 100 percent. The rating decreases as the slope increases.

Factor X--Other Conditions. Factor X is used to evaluate any limitations on the use of the soil, such as imperfect or poor drainage, salts or alkali, erosion, low natural fertility, or unfavorable microrelief. If more than one limitation exists, the values for each are multiplied together to get the rating for the X factor.

The index is obtained by multiplying together the values of the four factors. $A \times B \times C \times X = \text{Storie Index}$. The Storie index is calculated on the basis of soil properties and qualities alone. Land values, climate location, markets and other economic factors are not taken into account. The soils are arranged in grades according to their suitability for general intensive agriculture, as shown by their Storie index ratings (SCS 1964). The higher the rating the more suitable the soil is considered for agriculture.

8.2.3 LAND CAPABILITY CLASSIFICATION

The land capability classification is a separate means, from the Storie index rating, to classify soils in terms of agricultural suitability. The classification begins with individual soils and groups them into different categories primarily on their ability to produce common cultivated crops and pasture plants without soil deterioration over a long period of time (SCS 1964). The land capability classification for each of the soil phases which occur within the Study Area is presented in Table 8-3. This classification provides three different levels of information. These are as follows:

1. **Land Capability Classes.** The broadest category places all soils in one of eight capability classes. These are as arranged from I to VIII with limitations in soil use and risks of soil damage increasing from I to VIII.

Classes.

Land Suited for Cultivation and Other Uses.

- Class I: Soils in Class I have few limitations that restrict their use.
- Class II: Soils in Class II have some limitations that reduce the choice of plants or require moderate conservation practices.
- Class III: Soils in Class III have severe limitations that reduce the choice of plants or require moderate conservation practices.
- Class IV: Soils in Class IV have very severe limitations that restrict the choice of plants, require very careful management or both.

Land Generally Not Suited for Cultivation.

- Class V: Soils used in Class V have some limitations that generally make them unsuited for cultivation.
- Class VI: Soils used in Class VI have severe limitations that generally make them unsuited for cultivation.
- Class VII: Soils in Class VII have very severe limitations that make them unsuited for cultivation.
- Class VIII: Soils and land forms in Class VIII have limitations that preclude their use for commercial plant production and restrict their use for recreation, wildlife, water supply, or aesthetic purposes.

2. **Land Capability Subclass.** This category is a subdivision of the capability class to show the kind of limitation or hazard. Four subclasses are used: e (erosion), w (wetness), s (soil), and c (climate). These subclasses are subdivided by adding an Arabic numeral which is designated as a unit. This numeral is used to show a secondary major limitation or to supplement the major limitation and is defined in terms of a significant soil property. These subclasses include: e - Erosion; w - Wetness; s - Soil Limitation, and; c - Climatic Limitations.

3. **Land Capability Unit.** This unit is a group of soils that are similar in use and management and provides the more specific information in Land Capability Classification. The capability unit is symbolized by a combination of the Capability Class, Subclass and Unit. These capability units include: 0 - Coarse underlying material; 1 - Erosion hazard; 2 - Drainage or overflow; 3 - Slowly permeable sub-soils; 4 - Coarse textures; 5 - Fine textures; 6 - Salinity or alkali; 7 - Stony or rocky; 8 - Bedrock, and; 9 - Low Fertility.

8.2.4 HYDRIC SOIL LISTS

Hydric soils are soils which possess certain physical and chemical characteristics which may make them unsuitable or difficult to manage for certain types of agriculture. Hydric soils have developed under sufficiently wet conditions to support growth and regeneration of hydrophytic vegetation. More specifically, hydric soils are ones that meet the definition and criteria developed by the National Technical Committee for Hydric Soils (NTCHS). The criteria are selected soil properties that are documented in Soil Taxonomy (Soil Survey Staff, 1975, 1990) and Soil Interpretations Records (Soil Survey Staff, 1983). The NTCHS is chaired by Soil Conservation Service (SCS). Members include representatives from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Environmental Protection Agency, Agricultural Experiment Stations, U.S. Forest Service and the Bureau of Land Management.

The SCS maintains a local list of hydric soil map units for each soil survey area in the Field Office Technical Guide. Each soil survey area encompasses all or a portion of a county. They identify the soil map units that contain or may in some delineations contain hydric soils. These lists have the advantage, when used with the local soil survey report map sheets, of indicating the geographic distribution of hydric soils within a given area.

Hydric soil lists were prepared by the SCS for soils which occur within the eastern Stanislaus area (1992). Hydric soils within the Study Area, along with their landform designations, are presented in Table 8-3; five soils were found to possess hydric soil characteristics when they occur within depressions or drainageways.

8.3 AGRICULTURAL RESOURCES

Agriculture was the predominant land use in the Study Area as of 1994. The gross agricultural income for Stanislaus County in 1992, the most recent available record, was recently estimated at over one billion dollars (Stanislaus Co. 1992). Agricultural land use designations within the Study Area, including crop types, were obtained from maps provided by the California Department of Water Resources (DWR) for Stanislaus County (1988). Agricultural land uses within the Study Area are shown in Figure 8-8; Table 8-4 presents a legend of these land use designations. Land use maps of the Study Area were developed from field surveys conducted several years ago and may not represent current land use designations for the entire area. These inaccuracies are due primarily to alterations in cropping patterns and increased

urban development. The predominant crop types within the Study Area identified on the DWR maps, at the time of the surveys, were apples, apricots, peaches, plums, almonds, walnuts, corn, beans, pasture and vineyards.

8.3.1 DEPARTMENT OF CONSERVATION FARMLAND MAPPING AND MONITORING PROGRAM DEFINITIONS FOR IMPORTANT FARMLAND MAP CATEGORIES

Agricultural lands in California have also been inventoried by the California Department of Conservation (CDC 1980). This project was designed to inventory important farmlands for the purpose of monitoring conversion of these lands from agricultural use to urban and industrial land uses. This inventory identifies eight categories of farmlands including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-up Land, Other Land, and Land Committed to Nonagricultural Use. Each of the soil phases within the Study Area have been inventoried (see "Soil Resources" section in this chapter). Those soils satisfying the definition of Prime Farmland and Farmland of Statewide Importance are presented in Table 8-3 and Figure 8-9. Approximately 73 percent of the soils within the Study Area are classified as Prime Farmland and 12 percent are listed as Farmland of Statewide Importance (Table 8-3). Definitions of each of the important farmland categories are described below. These definitions have been excerpted from *A Guide to the Farmland Mapping and Monitoring Program, 1992*, Department of Conservation, Office of Land Conservation, Publication Number FM-92-01.

Prime Farmland (P). Prime Farmland is land which has the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods. Prime Farmland must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Soil types qualifying for this category were provided by the SCS.

Farmland of Statewide Importance (S). Farmland of Statewide Importance is land other than Prime Farmland which has a good combination of physical and chemical characteristics for the production of crops. It must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Soil types qualifying for this category were provided by the SCS.

Unique Farmland (U). Unique Farmland is land which does not meet the criteria for Prime Farmland or Farmland of Statewide Importance, that has been used for the production of specific high economic value crops (as listed in *California Agriculture* produced by the California Department of Food and Agriculture) at some time during the two update cycles prior to the mapping date. It has the special combination of soil quality, location, growing season and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. Examples of such crops may include publicly owned lands for which there is an adopted policy preventing agricultural use.

Farmland of Local Importance (L). Farmland of Local Importance is either currently producing crops, or has the capability of production. Farmland of Local Importance is land other than Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. This land may be important to the local economy due to its productivity. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use. This category varies from county-to-county and is determined by each county's board of supervisors and a local advisory committee.

Grazing Land (G). Grazing Land is land on which the existing vegetation, whether grown naturally or through management is suitable for grazing or browsing of livestock. The minimum mapping unit for Grazing Land is 40 acres.

Urban and Built-up Land (D). Urban and Built-up Land is used for residential, industrial, commercial, construction, institutional, public administrative purposes, railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other development purposes. Highways, railroads, and other transportation facilities are mapped as a part of Urban and Built-up Land if they are a part of the surrounding urban areas.

The minimum mapping unit is ten acres. Units of land smaller than ten acres will be incorporated into the surrounding map classifications. The building density for residential use must be at least one structure per 1.5 acres (or approximately 6 structures per 10 acres). Urban and Built-up Land must contain man-made structures or the infrastructure required for development (e.g., paved roads, sewers, water, electricity, or in specific circumstances, drainage or flood control facilities) that are specifically designed to serve that land. Parking lots, storage and distribution facilities, and industrial uses such as large packing operations for agricultural produce will generally be mapped as Urban and Built-up Land, even though they are associated with agriculture.

Urban and Built-up Land does not include strip mines, borrow pits, gravel pits, farmsteads, ranch headquarters, commercial feedlots, greenhouses, poultry facilities, and road systems for freeway interchanges outside of areas classified as Urban and Built-up Land areas. Within areas classified as Urban and Built-up Land, vacant and nonagricultural land which is surrounded on all sides by urban development and is 40 acres or less in size will be mapped as Urban and Built-up Land. Vacant and nonagricultural land larger than 50 acres in size will be mapped as Other Land.

Other Land (O). Other Land is that which is not included in any of the other mapping categories. The following types of land are generally included: a. Rural development which has a building density of less than one structure per 1.5 acres, but with at least one structure per ten acres; b. Brush, timber and other lands not suitable for livestock grazing; c. Government lands not available for agricultural use; d. Road systems for freeway interchanges outside of Urban and Built-up Land areas; e. Vacant and nonagricultural land larger than 40 acres in size and surrounded on all sides by urban development; f. Confined livestock facilities of 10 or more acres unless accounted for by the county's definition for Farmland of Local Importance; g. A variety of other rural land uses, and; h. Strip mines, borrow pits, gravel pits, ranch headquarters larger than 10 acres.

Land Committed to Nonagricultural Use. Land Committed to Nonagricultural Use is land that is permanently committed by local elected officials to nonagricultural development by virtue of decisions which cannot be reversed simply by a majority vote of a city council or county board of supervisors.

TABLE 8-4
LAND USE CATEGORY LEGEND FOR FIGURE 8-8

Category	Letter Designation	Use Group	Numeric Designation	Specific use
Agricultural	D	Deciduous fruits and nuts	1	Apples
			2	Apricots
			5	Peaches and nectarines
			7	Plums
			12	Almonds
			13	Walnuts
	G	Grain and hay crops	n/a	n/a
	F	Field crops	6	Corn
			8	Sudan
			10	Beans

	T	Truck and berry crops	19	Bushberries
	P	Pasture	1	Alfalfa and alfalfa mixtures
			3	Mixed pasture
	V	Vineyards	n/a	n/a
	I	Idle	1	Land cropped within the past three years but not tilled at time of survey
			2	New lands being prepared for crop production
	S	Semi-agricultural and incidental to agriculture	1	Farmsteads
			2	Feed lots (livestock and poultry)
			3	Dairies
			4	Lawn areas
Urban (U)	UI	Urban industrial	1	Manufacturing, assembling and general processing
	UV	Urban vacant	1	Miscellaneous unpaved areas
	N	Native	NV	Native vegetation
Special conditions are indicated by the following additional symbols and combination of symbols: F = fallow fields S = seed crops Y = young orchards and vines Source: California Department of Water Resources, (Stanislaus County), 1989.				

County boards of supervisors and city councils will have the final authority to designate lands in this category pursuant to the requirements of this section. The Department will work with city and county planning staffs to obtain this information. Land Committed to Nonagricultural Use will be shown on an overlay to the Important Farmland Series maps (and Interim Farmland Maps). The current land use will be indicated on the base map, with the overlay indicating the areas that are Committed to Nonagricultural Use.

Land Committed to Nonagricultural Use must be designated in an adopted, local general plan for future nonagricultural development. The resulting development must meet the requirements of *Urban and Built-up Land* or the rural development density criteria of *Other Land*. Land Committed to Nonagricultural Use must also meet the requirements of either (a) or (b) below:

- a. It must have received one of the following final discretionary approvals: 1. Tentative subdivision map (approved per the Subdivision Map Act); 2. Tentative or final parcel map (approved per the Subdivision Map Act); 3. Recorded development agreement (per Section 65864 of the Government Code), and; 4. Other decisions by a local government which are analogous to items #1-3 above and which exhibit the element of permanence discussed in Land Committed to Nonagricultural Use. Zoning by itself does not qualify as a permanent commitment.
- b. It must be the subject of one of the final fiscal commitments to finance the capital improvements specifically required for future development of the land in question as shown below: 1. Recorded Resolution of Intent to form a district and levy an assessment; 2. Payment of assessment; 3. Sale of bonds; 4. Binding contract secured by bonds, guaranteeing installation of infrastructure, and; 5. Other fiscal commitments which are analogous to items #1-4 above and exhibit the element of permanence discussed for Land Committed to Nonagricultural Use.

Land Committed to Nonagricultural Use will be mapped when the respective local government notifies the Department that the land meets qualifying criteria and submits maps at a scale of 1:24,000 identifying the area and showing its boundaries. The notification referred to will be subject to verification by the Department. In the case of land identified per Sections (a) 4 and (b) 5, the local government must also provide the Department with documentation of the permanent commitment.

8.3.2 WILLIAMSON ACT LANDS

Approximately 2,250 acres of land within the Study Area are under Williamson Act contract, as shown in Figure 8-10. Virtually all this territory is prime agricultural land. Nearly 180 acres within the existing sphere of influence was protested by the City.

8.4 BIOLOGICAL RESOURCES

Biological resources of the Study Area include biotic habitats, whether native, urban or agricultural, and the complete flora and fauna within this area. It also includes special-status plants and animals and other sensitive biotic resources. To assemble this information, current published documents regarding biological resources of the Study Area were reviewed; reconnaissance-level site visits to the Study Area were conducted during the winter and early-spring of 1993-1994.

8.4.1 BIOTIC HABITATS

Reconnaissance-level surveys were conducted in all biotic habitats of the Study Area. Plant communities were described in terms of their dominant tree, shrub and herbaceous vegetation and wherever possible, classified according to the nomenclature of Holland (1986). Lists of all plant species encountered during the survey were maintained (Appendix 8-A). The values of each biotic habitat identified in the Study Area were evaluated in order to predict their suitability for individual wildlife species. A list was made of all wildlife species observed during the survey and species which were determined to have the potential of occurring on site (Appendix 8-B).

Five different biotic habitats were observed within the Study Area. These habitats included agricultural, ruderal, urban, riparian forest and freshwater emergent. In general, the native flora of the Study Area has been replaced by a mixture of agricultural, horticultural and non-native annual grasses and forbs. The riparian forests along the banks of the Tuolumne River represent the only continuous expanse of native vegetation. The approximate distribution of these biotic habitats within the Study Area is presented in Figure 8-11. Expanded descriptions of these habitats are presented below.

Agricultural (Cropland/ Orchard/ Vineyard/ Pasture)

Vegetation. Agricultural fields occupied the majority of the Study Area. The predominant orchard and crop plants were apples (*Malus* sp.), apricots (*Prunus* sp.), peaches (*Prunus* sp.), plums (*Prunus* sp.), almonds (*Prunus* sp.), English walnuts (*Juglans regia*), corn (*Zea mays*) and beans (*Phaseolus* sp.). These croplands, along with, pasture and vineyards, have replaced much of the native grassland and riparian habitat once abundant in this portion of the San Joaquin Valley. Many of these fields are cultivated and planted on an annual basis or disced as part of weed control management practices. These activities favor invasion of these areas by weedy, non-native annual grasses and forbs. These species included riggut grass (*Bromus diandrus*), field bindweed (*Convolvulus arvensis*), Johnsongrass (*Sorghum halepense*), horseweed (*Conyza canadensis*), Dallis grass (*Paspalum dilatatum*), yellow star-thistle (*Centaurea solstitialis*) and black mustard (*Brassica nigra*).

Wildlife. Agricultural habitats such as found within the Study Area provide limited habitat for terrestrial vertebrates. The absence of an herbaceous understory deprives many species of both food and cover. On-going maintenance operations may discourage breeding. Still, some species have adapted to these conditions. Gopher snakes (*Pituophis melanoleucus*) may forage in the croplands for small mammals such as various species of mice or gophers. Western fence lizards (*Sceloporus occidentalis*) may be found near irrigation pipes or idle farm equipment. Western toad (*Bufo boreas*) and pacific treefrog (*Pseudacris regilla*) are likely to be the only amphibians present here.

Croplands provide foraging habitat for several bird species common to the Central Valley. Brewer's Blackbird (*Euphagus cyanocephalus*), Western Meadowlark (*Sturnella neglecta*), Mourning Dove (*Zenaidura macroura*), Scrub Jay (*Aphelocoma coerulescens*), Yellow-billed Magpie (*Pica nuttalli*) and American Crow (*Corvus brachyrhynchos*) are a few of the expected residents. A few summer visitors such as Western Kingbird (*Tyrannus verticalis*) are likely to forage here. Among the most likely winter visitors are American Pipit (*Anthus rubescens*) and White-crowned Sparrow (*Zonotrichia leucophrys*).

Several mammals are also expected to use agricultural lands even though the area is frequently disturbed. Some of the mammalian species expected on the project site are common even in disturbed or non-native habitats. These species include striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*) and coyote (*Canis latrans*). Small mammals that frequently utilize agricultural areas include black-tailed jackrabbit (*Lepus californicus*), Botta's pocket gopher (*Thomomys bottae*) and house mouse (*Mus musculus*).

Ruderal (Disturbed)

Vegetation. Ruderal (disturbed) habitat includes areas along fencelines, roadways, railroad tracks, the perimeter of agricultural fields, fallow fields and vacant lots. Species commonly found in these areas include rigput grass, telegraph weed (*Heterotheca grandiflora*), black mustard, slender wild oat, (*Avena barbata*), yellow star-thistle, Russian thistle (*Salsola tragus*), soft chess (*Bromus hordeaceus*), Jimson weed (*Datura meteloides*), filaree (*Erodium* sp.), curly dock (*Rumex crispus*), Johnson grass, prickly lettuce (*Lactuca serriola*), horseweed, field bindweed, barnyard grass (*Echinochloa crusgalli*) and turkey mullein (*Eremocarpus setigerus*).

Wildlife. In general, the ruderal areas in the planning area provide little value to wildlife because they are so sparsely vegetated. Bird species that occasionally utilize this habitat include House Finch (*Carpodacus mexicanus*) and American Goldfinch (*Carduelis tristis*). Mammals such as California ground squirrel (*Spermophilus beecheyi*) will make their burrows here, since it is disturbed less often than the neighboring cropland.

Urban (Industrial/ Residential/ Parks/ Schools)

Vegetation. The urban areas included a wide variety of tree, shrub and herbaceous species commonly used in landscaping including eucalyptus (*Eucalyptus* sp.), ash (*Fraxinus* sp.), and pines (*Pinus* sp.), and several native species including black walnut (*Juglans californica* var. *hindsii*) and valley oak (*Quercus lobata*).

Wildlife. Streets, homes, commercial buildings and residential and commercial landscaping have favored an assemblage of plants and animals quite different than that expected from nearby croplands, orchards and vineyards and ruderal areas. Although reptiles and amphibians are poorly represented in urban habitats, up to 120 species of birds may use urban habitats, many only briefly during the spring and fall migration (Mayer et al 1988). Several types of birds such as White-crowned Sparrows, Dark-eyed Juncos (*Junco hyemalis*), Northern Mockingbirds (*Mimus polyglottos*) and Scrub Jays are resident in urban habitats. However, their overall value to wildlife is relatively low due to the periodic disturbances associated with maintaining lawns and the presence of humans, cars, domestic pets, etc.. Introduced species like the Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), house mouse (*Mus musculus*) and Norway rat (*Rattus norvegicus*) often displace native species that are more sensitive to human disturbance.

Riparian Forest

Vegetation. Riparian forests occur along the top-of-bank and within the flood plain of the Tuolumne River within the Study Area. This habitat has several vegetation layers including upper and lower canopy trees, shrubs and herbaceous species. Common canopy species included valley oak, box elder (*Acer negundo* var. *californicum*), Mexican elder (*Sambucus mexicana*), California sycamore (*Platanus racemosa*), red willow (*Salix laevigata*), Fremont cottonwood (*Populus fremontii*), black walnut and Gooding's willow (*Salix goodingii*). Two relatively common non-native species in this canopy includes tree-of-heaven (*Ailanthus altissima*) and eucalyptus. Understory species included saplings of these mature species and a variety of shrubs including California blackberry (*Rubus californicus*), Himalaya blackberry (*Rubus procerus*), mulefat (*Baccharis viminea*), California rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*) and California buckeye (*Aesculus californica*). Herbaceous vegetation is dominated by a variety of non-native annual grasses and forbs commonly found throughout the Study Area.

Wildlife. The leaf litter and fallen branches from the big trees provide cover for amphibians such as western toad, and pacific treefrog. Several lizards can also be found here including western fence lizard, and Gilbert's skink. Snakes expected to be found here include gopher snake, common kingsnake (*Lampropeltis getulus*) and common garter snake (*Thamnophis sirtalis*).

The greatest diversity of birds to be found on the project site can be expected to be found in this habitat. Both Red-shouldered Hawks (*Buteo lineatus*) and Great Horned Owls hunt and roost here. Woodpeckers, such as Nuttall's Woodpecker (*Picoides nuttalli*) and Northern Flicker (*Colaptes auratus*) excavate nest holes in trees. Nest holes abandoned by woodpeckers are important because they become homes to other birds such as Ash Throated Flycatcher (*Myiarchus cinerascens*), House Wren (*Troglodytes aedon*) and Western Screech Owl (*Otus kennicottii*). Other songbirds found in this habitat include Scrub Jay (*Aphelocoma coerulescens*), Black Phoebe (*Sayornis nigricans*), Northern Oriole (*Icterus galbula*) and Bewick's Wren (*Thryomanes bewickii*).

The riparian forest is also important to mammals of the project site. Small mammals occurring in tall grass or brushy thickets may include the ornate shrew (*Sorex ornatus*), Audubon's cottontail (*Sylvilagus auduboni*) and beaver, which prefer the soft bark of young willows. During the night raccoons (*Procyon lotor*) and striped skunks (*Mephitis mephitis*) forage along the riverbank for frogs and crustaceans. Predators such as gray fox (*Urocyon cinereoargenteus*) and long-tailed weasel (*Mustela frenata*) are likely to be attracted to the wooded riparian habitat due to its abundance of prey. The Tuolumne River, in addition to providing a year-long source of drinking water, may serve also as an important movement corridor for animals.

Freshwater Emergent

Vegetation. Emergent freshwater vegetation occurs within the banks of the Tuolumne River on sandbars and along the bottom of the banks on gravels directly adjacent to water. Vegetation included cattails (*Typha* sp.), California bulrush (*Scirpus californicus*), umbrella sedge (*Cyperus eragrostis*) and sandbar willow (*Salix hindsiana*).

Wildlife. The Tuolumne River is home to many fish including native species such as Sacramento squawfish (*Ptychocheilus grandis*), hardhead (*Mylopharodon conocephalus*), rainbow trout (*Oncorhynchus mykiss*) and Sacramento perch (*Archoplites interruptus*). Introduced fish that have become common include largemouth and smallmouth bass (*Micropterus salmoides* and *Micropterus dolomieu*), green sunfish (*Lepomis cyanellus*), mosquito fish (*Gambusia affinis*) and carp (*Cyprinus carpio*).

This aquatic habitat is important to amphibians found in the planning area. Though found in other habitats, western toad and pacific treefrog (*Pseudacris regilla*) require aquatic habitats for reproduction. Bullfrogs (*Rana catesbeiana*) utilize aquatic habitats for foraging and cover as well as reproduction.

The Tuolumne River also provides habitat for several birds. Waterfowl such as Wood Duck (*Aix sponsa*), and Mallard (*Anas platyrhynchos*) use this portion of the river. Other birds that forage in the river include Great Blue Heron (*Ardea herodias*), Great Egret (*Casmerodius albus*), Double-crested Cormorant (*Phalacrocorax auritus*), Pied-billed Grebe (*Podilymbus podiceps*), and Belted Kingfisher (*Ceryle alcyon*). Mammals from surrounding areas will utilize the river as a source of drinking water. In addition, beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*) use the river for cover and as a movement corridor. These two species are never found far from water.

8.4.2 SENSITIVE BIOTIC RESOURCES

Special-Status Plants and Animals

Chapter 8: Natural and Agricultural Resources

Several plant species which have been given special status under state and/or federal species legislation are known to occur in the vicinity of the project site. A number of special-status wildlife species are also known to occur in appropriate habitat in the region. A search of published accounts on the location of these species was conducted within the Ceres and Brush Lake Quadrangles (U.S. Geological Survey Topographical Quadrangle Map) using California Diversity Data Base Rarefind reports (1993), and the California Native Plant Society *Inventory of Rare and Endangered Vascular Plants of California* (1988, 1993). In addition, the search was extended into each of the adjoining quads including: Riverbank, Waterford, Denair, Turlock, Hatch, Salina, Ripon, Westley, Patterson, and Crows Landing. Prior environmental documents and internal documents were also reviewed. Local experts were contacted regarding the potential occurrence of special-status plants in the project areas.

Reconnaissance-level field surveys were conducted for habitat of special-status plant and animal species in the project area. Table 8-5 presents a list of special-status plant and animal species, their status, preferred habitat and potential for occurrence within the project area. The valley elderberry longhorn beetle is the only federally-listed species which may occur within the Study Area. Suitable habitat for three additional federal candidate species occurs within the Study Area and includes the delta button celery, Sacramento splittail and southwestern pond turtle. Several California state species of special concern (CSC) are known to occur in the Tuolumne River; these species include river lamprey, chinook salmon, steelhead-rainbow trout, hitch, hardhead, Sacramento squawfish and Sacramento sucker. Several bird species of special concern are either known to occur within the project area or suitable habitat for these species is present within the Study Area. These species include Double-crested Cormorant, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, California Gull, Long-eared Owl, Yellow Warbler and Yellow-breasted Chat. Habitat also occurs in and around Ceres for the Black-shouldered Kite, a fully protected species in the state of California. The remainder of the special-status species identified in Table 8-5 are unlikely to occur due to lack of suitable habitat.

Special-Status Species Regulations Overview

Several plant and animal species known to occur in the vicinity of the project site have been given special status under federal or state endangered species legislation or otherwise have been designated as sensitive by state resource agencies or professional organizations whose lists are recognized by responding agencies when reviewing environmental documents. Such species are referred to collectively as "species of special-status".

Federally-listed threatened and endangered species and their habitats are protected under provisions of the Endangered Species Act. Death, capture, and similar actions affecting individuals of threatened and endangered species, conversion of their habitat, or other actions that may adversely affect the survival of individuals or populations are termed "take". Activities which may "take" individuals and actively or potentially use habitat are regulated by the Endangered Species Office of the U.S. Fish and Wildlife Service (USFWS). Candidate species on Lists 1 and 2 also receive special attention from federal agencies during environmental review. Taxa for which the USFWS has sufficient biological information to support a proposal to list as Endangered or Threatened are placed in Category 1. Taxa whose listing may be warranted according to existing information, but for which substantial biological information to support a proposed rule is lacking, are placed in Category 2.

Some candidate species have been petitioned for federal listing. These species are often treated by resource agencies as if they were actually listed during the environmental review process. Most birds and their active nests are protected by the Federal Migratory Bird Treaty Act.

State-listed threatened and endangered species and their habitats are protected under provisions of California's Endangered Species Act. Activities which may "take" individuals and actively or potentially use habitat may be regulated by the California Department of Fish and Game. The Department of Fish and Game has also produced three lists of "species of special concern" which serve as "watch lists". Species on these lists either are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review but do not have statutory protection.

Vascular plants listed as rare or endangered by the California Native Plant Society (California Native Plant Society 1988, 1993), but which have no designated status under state endangered species legislation, are defined as follows:

- List 1B. Plants Rare, Threatened, or Endangered in California and elsewhere.
- List 2. Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere.
- List 3. Plants About Which We Need More Information - A Review List.
- List 4. Plants of Limited Distribution - A Watch List.

Species	Status	Habitat	Potential for Occurrence
ANIMALS			
Western Yellow-billed Cuckoo (<i>Coccyzus americanus occidentalis</i>)	CE	Requires dense, multi-canopied riparian forests	Unlikely; the riparian habitat along the Tuolumne River is not dense enough to be suitable habitat
Willow Flycatcher (<i>Empidonax traillii</i>)	CE,FSS	Willow thickets associated with riparian habitats and montane meadows	Unlikely; the riparian habitat along the Tuolumne River is not dense enough to be suitable habitat
Valley Elderberry Longhorn Beetle (<i>Desmocerus californicus dimorphus</i>)	FT	Requires mature elderberry shrubs	Possible; there are elderberry shrubs along the Tuolumne River
Giant Garter Snake (<i>Thamnophis gignis</i>)	FT,CT	Fresh emergent wetlands, riparian systems of low gradient streams and occasionally rice fields	Unlikely; there is no suitable habitat in the Study Area
Swinson's Hawk (<i>Buteo swainsoni</i>)	CT	In Central Valley, uses open grasslands proximate to large trees, which serve as nesting sites; usually associated with riparian systems; may forage in some agricultural crops	Unlikely; there are only small amounts of marginal foraging habitat in the Study Area
Greater Sandhill Crane (<i>Grus canadensis tabida</i>)	CT	In Central Valley, may be found in fresh emergent wetlands, annual grasslands and agricultural lands, especially plowed fields of rice or corn	Unlikely; there is no suitable habitat in the Study Area
Sacramento Splittail (<i>Pogonichthys macrolepidotus</i>)	FPT, CSC	This fish inhabits rivers and streams that are tributaries of the Sacramento River	Known; has been recorded in the Tuolumne River
California Tiger Salamander (<i>Ambystoma californiense</i>)	FC1,CSC	Found primarily in annual grasslands; requires vernal pools for breeding and rodent burrows for refuge	None; there are no vernal pools in the Study Area
California Red-legged Frog (<i>Rana aurora draytonii</i>)	FC1, CSC	Inhabits quiet pools of streams, marshes and occasionally ponds, often with overhanging vegetation	None; this species has been extirpated from the Study Area
Southwestern Pond Turtle (<i>Clemmys marmorata marmorata</i>)	FC1,CSC	Associated with permanent or nearly permanent water in a wide variety of habitats	Possible; the Tuolumne River is both suitable habitat and a movement corridor
California Horned Lizard (<i>Phrynosoma coronatum frontale</i>)	FC2, CSC	Occurs in valley-foothill hardwood, conifer and riparian habitats, as well as in pine-cypress, juniper and annual grassland habitats	Unlikely; the Study Area is too disturbed by agricultural, commercial, and residential development to be suitable habitat

TABLE 8-5

*LIST OF SPECIAL-STATUS SPECIES FOR THE CERES GENERAL PLAN STUDY AREA

River Lamprey (<i>Lampetra ayresi</i>)	CSC	Aquatic, found in rivers and streams	Known; has been recorded in the Tuolumne River
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	CSC	Spends most of adult life in the Pacific Ocean, breeds in inland rivers	Known; has been recorded in the Tuolumne River
Steelhead-Rainbow Trout (<i>Oncorhynchus mykiss</i>)	CSC	Spends most of adult life in the Pacific Ocean, breeds in inland rivers	Known; has been recorded in the Tuolumne River
Hitch (<i>Lavinia exilicuda</i>)	CSC	Found in freshwater habitats	Known; has been recorded in the Tuolumne River
Hardhead (<i>Mylopharodon conocephalus</i>)	CSC	Found in freshwater habitats	Known; has been recorded in the Tuolumne River
Sacramento Squawfish (<i>Ptychocheilus grandis</i>)	CSC	Found in freshwater habitats	Known; has been recorded in the Tuolumne River
Sacramento Sucker (<i>Catostomus occidentalis</i>)	CSC	Found in freshwater habitats	Known; has been recorded in the Tuolumne River
Double-crested Cormorant (<i>Phalacrocorax auritus</i>)	CSC	Occurs on inland lakes, in fresh, salt, and estuarine waters	Possible; the Tuolumne River is both suitable habitat and a movement corridor
Northern Harrier (<i>Circus cyaneus</i>)	CSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas	Possible; this species is wide spread on the valley floor, however, only small amounts of marginally suitable habitat for this species are found within the Study Area
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	CSC	Breeds in ponderosa pine, black oak, riparian deciduous, mixed conifer and Jeffrey pine; north facing slopes with plucking perches are critical; many habitats are used in winter	Likely; this species is uncommon but of regular occurrence in many habitats in the Central Valley in the winter and during migration
Cooper's Hawk (<i>Accipiter cooperii</i>)	CSC	Breeds in most of the wooded habitats found in the state; uses many habitats in winter	Known; this species is uncommon but of regular occurrence in many habitats in the Central Valley in the winter and during migration
Long-billed Curlew (<i>Numenius americanus</i>)	CSC	In winter, uses coastal estuaries, upland herbaceous areas and croplands	Unlikely; this species is fairly common in winter in the Central Valley, but suitable habitat is limited in the Study Area
California Gull (<i>Larus californicus</i>)	CSC	In winter, uses estuarine, inter-tidal, pelagic, lacustrine, emergent wetlands, riverine, and croplands	Known; this species was observed at the City's sewage disposal ponds, it may also occur in plowed fields, dump sites and other areas during winter and migration; there is no breeding habitat in the Study Area
Burrowing Owl (<i>Speotyto cunicularia</i>)	CSC	Resident of open, dry grassland and desert habitats, and in sparse and open seedlings and saplings stages of piñon-juniper and ponderosa pine habitats	Unlikely; the Study Area is too disturbed by agricultural, commercial, and residential development to be suitable habitat
Long-eared Owl (<i>Asio otus</i>)	CSC	Primarily in riparian habitats, also in dense live oak thickets and other dense stands of trees	Possible; this species could occur in the Study Area during the winter or migration, though its occurrence there would be incidental at best
Yellow Warbler (<i>Dendroica petechia</i>)	CSC	Breeds in riparian woodlands from coastal and desert low-lands up to 8000 ft. in the Sierra Nevada; also in montane chaparral and open ponderosa pine and mixed conifer	Possible; though disturbances to the Tuolumne River have made it unsuitable as breeding habitat, this species may be present during migration
Yellow-breasted Chat (<i>Icteria virens</i>)	CSC	Breeds in valley-foothill riparian up to about 4800 ft., and up to 6500 ft in desert riparian habitats east of the Sierra Nevada	Possible; though disturbances to the Tuolumne River have made it unsuitable as breeding habitat, this species may be present during migration
Pale Big-eared Bat (<i>Plecotus townsendii pallascens</i>)	CSC	Found in all habitats except alpine and subalpine; most abundant in mesic habitats	Unlikely; the Study Area is mainly devoid of caves and other suitable roosting places; this species could forage in the Study Area, but its presence there would be incidental at best
Pallid Bat (<i>Antrozous pallidus</i>)	CSC	Occurs in a variety of habitats, including grasslands, shrublands, woodlands, and forests; most common in dry open habitats with rocky areas for roosting	Unlikely; the Study Area is mainly devoid of caves and other suitable roosting places; this species could forage in the Study Area, but its presence there would be incidental at best
San Joaquin Pocket Mouse (<i>Perognathus inornatus inornatus</i>)	CSC	Occurs in dry, open grasslands or scrub areas on fine textured soils between 350 and 650 ft. in elevation	Unlikely; the Study Area is too disturbed by agricultural, commercial, and residential development to be suitable habitat
American Badger (<i>Taxidea taxus</i>)	CSC	Most abundant in drier open stages of most shrub, forest and herbaceous habitats, with friable soils	Unlikely; the Study Area is too disturbed by agricultural, commercial, and residential development to be suitable habitat
Black-shouldered Kite (<i>Elanus caeruleus</i>)	SP	Inhabits herbaceous and open stages of most habitats, mostly in cismontane California; rarely found away from agricultural areas	Possible; this species is wide spread on the valley floor, however, only small amounts of marginally suitable habitat for this species are found within the Study Area
PLANTS			
Hartweg's pseudobahia (<i>Pseudobahia bahiifolia</i>)	FPE, CE CNPS 1B	Clay soils in cismontane woodland and valley and foothill grassland	Presumed absent; habitat suitable for his species is not found within the Study Area
Colusa grass (<i>Neostaphia colusana</i>)	FCI, CE, CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area
San Joaquin Valley orcutt grass (<i>Orcuttia inaequalis</i>)	FCI, CE, CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area
Hairy orcutt grass (<i>Orcuttia pilosa</i>)	FCI, CE CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area

TABLE 8-5

*LIST OF SPECIAL-STATUS SPECIES FOR THE CERES GENERAL PLAN STUDY AREA

Succulent ovals clover (<i>Orthocarpus campestris</i> var. <i>succulentus</i>)	FC2, CE, CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area
Delta button celery (<i>Eryngium racemosum</i>)	FC2, CE, CNPS 1B	Riparian scrub, on seasonally inundated clay floodplain	Possible; could occur along the Tuolumne river
Greene's tuctoria (<i>Tuctoria greenii</i>)	FC1, CR CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area
Merced monardella (<i>Monardella leucocephala</i>)	FC1, CNPS 1A	Valley and foothill grassland; moist depressions in subalkaline, sandy, soils.	Presumed absent; valley grassland and sandy alkaline soils do not occur within the Study Area
Hoover's spurge (<i>Chamaesyce hooveri</i>)	FC1, CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area
Heart-leaved saltbush (<i>Atriplex cordulata</i>)	FC2, CNPS 1B	Saline and alkaline soils in chenopod scrub and valley and foothill grasslands	Presumed absent; chenopod scrub and saline and alkaline soils do not occur within the Study Area
Parish's saltbush (<i>Atriplex parishii</i>)	FC2, CNPS 1B	Chenopod scrub, plays, and vernal pools	Presumed absent; chenopod scrub and saline and alkaline soils do not occur within the Study Area
Beaked clarkia (<i>Clarkia rostrata</i>)	FC2, CNPS 1B	Cismontane woodland, valley and foothill grassland	Presumed absent; valley grassland does not occur within the planning area
Red-flowered bird's-foot trefoil (<i>Lotus rubriflorus</i>)	FC2, CNPS 1B	Cismontane woodland, valley and foothill grassland (only 2 occurrences known)	Presumed absent; valley grassland does not occur within the planning area
Legenere (<i>Legenere limosa</i>)	FC2, CNPS 1B	Vernal pools	Presumed absent; vernal pools do not occur within the Study Area

*, Adapted from Zeiner et al., 1988.

STATUS CODES

FE = Federally Endangered	CE = California Endangered
FT = Federally Threatened	CT = California Threatened
FPE = Federally Proposed Endangered	CR = California Rare
FPT = Federally Proposed Threatened	CSC = California State Species of Special Concern
FC1 = Federal Candidate, Category 1	SP = Fully Protected Species in the State of California
FC2 = Federal Candidate, Category 2	CNPS = California Native Plant Society
FSS = Federal (BLM and USFS) Sensitive Species	

Jurisdictional Waters

Areas meeting the regulatory definition of "Waters of the United States" (jurisdictional waters) are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE). The USACE under provisions of Section 404 of the Clean Water Act (1972), has jurisdiction over "Waters of the U.S." These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the U. S.", tributaries of waters otherwise defined as "Waters of the U.S.", the territorial seas, and wetlands adjacent to "Waters of the U.S." (33 CFR, Part 328, Section 328.3).

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water-filled depressions (33 CFR, Part 328).

Specific surveys were not conducted within the Study Area for areas which met the regulatory definition of "Waters of the United States." However, the U.S. Fish and Wildlife Service has prepared a Classification of Wetlands and Deepwater Habitats of the United States and accompanying National Wetland Inventory Maps which include the Study Area. These maps have been prepared using U.S. Geological Survey Quadrangle Maps as a base. This classification, to be used in the new inventory of wetlands and deepwater habitats of the United States, is intended to describe ecological taxa, arrange them in a system useful to resource managers, furnish units for mapping, and provide uniformity of concepts and terms (Cowardin et al. 1977). Wetlands are defined by plants (hydrophytes), soils (hydric soils) and frequency of flooding. Areas within the Study Area which satisfy the USFWS definition for wetlands are shown in Figure 8-12; designation codes used on this figure area presented in Table 8-6.

TABLE 8-6 NATIONAL WETLAND INVENTORY CODES

Legend	Wetland Description
PEMCh	Palustrine, emergent, seasonally flooded, diked impounded
PEMCx	Palustrine, emergent, seasonally flooded, excavated
PFOA	Palustrine, forested, temporarily flooded
PFOC	Palustrine, forested, seasonally flooded
PFOW	Palustrine, forested, intermittently flooded/temporary
PSSA	Palustrine, scrub/shrub, temporarily flooded
PUBFx	Palustrine, unconsolidated bottom, semipermanently flooded, excavated
PUBHx	Palustrine, unconsolidated bottom, permanently flooded, excavated
PUBKx	Palustrine, unconsolidated bottom, artificially flooded, excavated
PUSCh	Palustrine, unconsolidated shore, seasonally flooded, diked/impounded
PUSCx	Palustrine, unconsolidated shore, seasonally flooded, excavated
PUSKx	Palustrine, unconsolidated shore, artificially flooded, excavated
R2UBH	Riverine, lower perennial, unconsolidated bottom, permanently flooded
R2UBKHrx	Riverine, lower perennial, unconsolidated bottom, artificially/permanently flooded, artificial substrate, excavated
R2USA	Riverine, lower perennial, unconsolidated shore, temporarily flooded
R45BAx	Riverine, intermittent, unknown perennial, saturated, temporarily flooded, excavated

R45BKCx	Riverine, intermittent, unknown perennial, saturated, artificially flooded, seasonally flooded, excavated
U	Primarily upland areas, but may include unclassified wetlands
Palustrine: Includes all nontidal wetlands dominated by trees, shrubs, persistent emergents and emergent mosses and lichens	
Riverine: Generally includes all wetlands and deepwater habitats contained within a channel	
Sensitive Biotic Habitats	

Riparian Forest. Sensitive biotic habitats, like the riparian forest within the Study Area, are those which were once common but are now of limited extent. In the past these areas have been impacted by conversion of lands directly adjacent to and within the riparian corridor to agriculture and urban land uses without regard for riparian buffer zones to protect these sensitive resources. Riparian habitats are generally rich in botanical and wildlife resources and may support large numbers of special-status plants and animals. Continued development of this habitat will significantly affect the wildlife species using these areas, and in some cases, may lead to their extirpation within Stanislaus County.

Riparian habitats of great biotic value were once extensive throughout the Central Valley of California. Kuechler (1977) shows vast expanses of riparian habitat along the Sacramento River and its tributaries and the lower portions of the San Joaquin River and its tributaries. It has been estimated that the total area of pre-settlement riparian forests within the Central Valley exceeded 900,000 acres (Katibah 1981). Of this amount, extensive areas of riparian forest formed linear corridors along the Chowchilla, Fresno, upper San Joaquin, Kings, Tuolumne, Tulare and Kern Rivers. These riparian forests were used by migratory species for movement, or were used by numerous species dependent on their structural and floristic complexity to meet other ecological needs (breeding and foraging). Since the time of the gold rush these forests have been cut down for fuel wood, cleared for agriculture, or otherwise been destroyed or degraded by stream channelization, diversions of water for agriculture, or the lowering of local groundwater by pumping. Although it is generally recognized that only a small fraction of the pre-settlement riparian habitats remain today, good estimates for the present size of these habitats are hard to come by. By one estimate only 2 percent of the original riparian forest of the Sacramento River remains today (McGill 1975, 1979). Katibah estimates that 11 percent of the pre-settlement riparian forest of the entire Central Valley remains today (1981). Of the remaining riparian forest in the Central Valley of California, it is estimated that 48 percent is in a disturbed or degraded condition (Katibah 1981).

8.5 AIR RESOURCES

Air quality is severely degraded in the San Joaquin Valley. The Valley's meteorology combined with air pollutants transported into the air basin and locally generated pollutants from automobiles, factories and agricultural operations result in contaminant levels within the San Joaquin Valley Air Basin surpassed only by those within the infamous South Coast Air Basin.

One of the major reasons that air quality continues to be a problem in the San Joaquin Valley Air Basin and California in general is a relatively high rate of population and economic growth. The major obstacle to improved air quality in the future is increasing population and vehicle use and deteriorating operating conditions on highways and roads.

The most efficient and cost-effective technological or "hardware" controls have already been implemented. Remaining technological controls, which are increasingly expensive, have been found to be unable to reduce emissions to the point where all air quality standards would be met. Therefore, attention has been focussed in recent years on the relationship of land use, community design and transportation as a means of reducing air pollutant generation.

Addressing air quality issues within General Plans has become an important regional strategy for improving air quality in recent years. While air quality is often regarded as a regional problem, local land use and growth decisions by cities and counties will profoundly affect the success of whatever technology is available regionally to combat air pollution. The San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) has prepared a model air quality element that can be used as guidelines for preparing policies and programs related to air quality in general plans of cities and counties within the eight-county district.

8.5.1 AIR BASIN CLIMATOLOGY

The amount of a given pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major factors affecting transport and dilution are terrain, wind, atmospheric stability, and, for photochemical pollutants, sunshine.

Ceres is within the northern portions of the eight-county San Joaquin Valley Air Basin. This air basin is a well-defined climatic region, primarily because of the topographic barriers which form distinct boundaries on three sides of the basin. The western boundary is formed by the Coast Range, the southern boundary by the Tehachapi Mountains, and the eastern boundary by the Sierra Nevada. Only the northern boundary is not marked by a distinct topographic feature. At the northern end of the basin the Carquinez Strait, a sea level gap between the Coast Ranges, extends to the west and is a major source of ventilation.

Ceres lies within the low, flat San Joaquin Valley. This area is characterized by hot summers and mild winters. The San Joaquin Valley floor is quite arid due to a rain "shadow" created by the series of coast mountain ranges separating the valley from the Pacific Ocean.

There are no permanent wind monitoring sites with long term records in Ceres, but wind data is available for nearby Modesto. Table 8-7 shows wind direction frequencies for Modesto. Winds from the northwesterly quadrant are most frequent. Winds from these directions are also the highest, on average. Table 8-7 shows that a secondary maxima for wind direction exists for southeast winds; this is the prevailing wind direction associated with winter storms.

Within the northern San Joaquin Valley northwesterly winds dominate during the spring and summer months, and show a strong daily variation. Highest average windspeeds occur in the afternoon and evening hours; lightest winds occur in the night and morning hours. During fall and winter northwesterly winds still predominate, but wind direction is more variable, and calm conditions are more frequent.

The climate and geography of the San Joaquin Valley is very conducive to the air quality degradation. The summertime wind pattern carries pollutants from adjacent air basins into the Valley and to the south. Locally-generated pollutants are also carried to the south where ventilation is restricted by mountains. The hot temperatures and frequent sunshine typical of the summer months promote the formation of photochemical pollutants such as ozone.

The fall and winter months are characterized by frequent periods of stagnation. These conditions result in elevated concentrations of locally-generated pollutants such as suspended particulates and carbon monoxide.

TABLE 8-7 WIND DIRECTION FREQUENCIES Modesto	
Wind Direction	Frequency (%)
North	10.6
North-Northeast	6.1
Northeast	1.1
East-Northeast	1.3
East	1.1
East-Southeast	5.0
Southeast	4.6
South	1.2
South-Southwest	1.4
Southwest	0.6
West-Southwest	1.0
West	1.4
West-Northwest	9.0
Northwest	9.9
North-Northwest	27.7
Calm	10.5
Source: California Department of Water Resources, 1978	

8.5.2 CURRENT AIR QUALITY

Air Quality Standards

The Environmental Protection Agency has set national ambient air quality standards for pollutants determined to be injurious to public health or welfare. There are both primary and secondary ambient air quality standards. Primary standards are designed to protect public health, with a margin of safety. Secondary standards are designed to protect public welfare, in addition to health, and are therefore more stringent than primary standards. States may adopt more stringent standards than those required by the federal government. The State of California has established health-based ambient air quality standards which are more stringent than the federal standards.

Federal and state standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulates (PM-10) and lead. California has also set standards for pollutants not covered by national standards (sulfates, hydrogen sulfide, vinyl chloride, visibility reducing particles). The state and federal primary standards for major pollutants are shown in Table 8-8.

The San Joaquin Valley Unified Air Pollution Control District and California Air Resources Board operate a network of air quality monitoring sites within the San Joaquin Valley Air Basin. While none are located in Ceres, two monitoring sites are located in nearby Modesto. The Modesto 14th Street monitoring site (814 14th Street) measures three gaseous pollutants: ozone, carbon monoxide and nitrogen dioxide. The Modesto Courthouse site (1100 I Street) measures suspended particulates (PM-10).

A summary of air quality data for the Modesto monitoring sites is shown in Table 8-9. The data shown includes annual maximum concentrations, the number of days that the state or federal air quality standards were exceeded, and annual statistics for PM-10.

Table 8-9 shows that the standards for ozone and PM-10 are currently exceeded in Ceres. Both pollutants are regional problems affecting the entire San Joaquin Valley Air Basin. Modesto has also experienced violations of the eight-hour state and federal standards for carbon monoxide. In general, air quality has been gradually improving in Modesto and the greater San Joaquin Valley Air Basin, but air quality still does not meet all state and federal standards.

Characteristics of Pollutants

The primary air quality problems in Ceres are ozone, carbon monoxide and suspended particulates (PM-10). The following is a discussion the nature of these pollutants, their major sources, and the health effects resulting from exposure to these pollutants.

Ozone

Ozone is produced by chemical reactions, involving nitrogen oxides (NO_x) and reactive organic gases (ROG), that are triggered by sunlight. Nitrogen oxides are created during combustion of fuels, while reactive organic gases are emitted during combustion and evaporation of organic solvents. Since ozone is not directly emitted to the atmosphere, but is formed as a result of photochemical reactions, it is considered a secondary pollutant. In the San Joaquin Valley Air Basin, ozone is a seasonal problem, occurring roughly from April through October.

TABLE 8-8 FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS			
Pollutant	Averaging Time	Federal Primary Standard	California Standard
Ozone	1-Hour	0.12 PPM	0.09 PPM
Carbon Monoxide	8-Hour	9.0 PPM	9.0 PPM
	1-Hour	35.0 PPM	20.0 PPM
Nitrogen Dioxide	Annual	0.05 PPM	---

	1-Hour	---	0.25 PPM
Sulfur Dioxide	Annual	0.03 PPM	---
	24-Hour	0.14 PPM	0.04 PPM
	1-Hour	---	0.25 PPM
Suspended Particulates	Annual	50 ug/m3	30 ug/m3
	24-Hour	150 ug/m3	50 ug/m3
Lead	30-Day Avg.	---	1.5 ug/m3
	3-Month Avg.	1.5 ug/m3	---
PPM = Parts Per Million ug/m3 = Micrograms per Cubic Meter			

TABLE 8-9 SUMMARY OF AIR QUALITY DATA Modesto 1988-1992					
Parameter	1988	1989	1990	1991	1992
Ozone					
Maximum 1-Hour Concentration, PPHM	12	12	13	11	11
Days Above Federal 1-Hour Standard	0	0	1	0	0
Days Above State 1-Hour Standard	29	20	13	23	10
Carbon Monoxide					
Maximum 8-Hour Concentration, PPM	13	13	11	11	7
Days Above Federal/State 8-Hour Standard	2	10	3	2	0
Suspended Particulate (PM-10)					
Maximum 24-Hour Concentration, ug/m3	175	148	171	157	150
Days Above Federal 24-Hour Standard	1	0	1	0	0
Days Above State 24-Hour Standard	11	21	23	24	18
Annual Geometric Mean	36.4	45.4	40.7	42.1	38.6
Annual Arithmetic Mean	44.0	54.2	50.0	52.6	43.6
PPHM - Parts Per Hundred Million PPM - Parts Per Million ug/m3 - Micrograms Per Cubic Meter					
Source: California Air Resources Board, 1989-1993					

Ozone is a strong irritant that attacks the respiratory system, leading to the damage of lung tissue. Asthma, bronchitis and other respiratory ailments as well as cardiovascular diseases are aggravated by exposure to ozone. A person exposed to high concentrations may become nauseated or dizzy, may develop headache or cough, or may experience a burning sensation in the chest.

Research has shown that exposure to ozone damages the alveoli (the individual air sacs in the lung where the exchange of oxygen and carbon dioxide between the air and blood takes place). Research has shown that ozone also damages vegetation.

Carbon Monoxide

Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels, and its main source in the San Joaquin Valley is automobiles. Because its major source is automobiles, high concentrations of carbon monoxide are typically found very close to major roadways and intersections.

Emissions of carbon monoxide from automobiles is highly dependent on the operating conditions. Congested traffic, with extended idling times and slow speeds creates far more carbon monoxide than free-flowing traffic. The term "hot spot" is often used to describe an area of high concentration surrounding near a surface intersection or freeway interchange.

Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, carbon monoxide reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity and impaired mental abilities.

Suspended Particulates (PM-10)

PM-10 is small suspended particulate matter, 10 microns or less in diameter, which can enter the lungs. The major component of PM-10 are dust particles, nitrates, and sulfates. PM-10 is directly emitted to the atmosphere as a by-product of fuel combustion, wind erosion of soil and unpaved roads. Small particles are also created in the atmosphere through chemical reactions.

Particles greater than 10 microns in diameter can cause irritation in the nose, throat, and bronchial tubes. Natural mechanisms remove much of these particles, but particles less than 10 microns in diameter are able to pass through the body's natural defenses and the mucous membranes of the upper respiratory tract and enter into the lungs. The particles can damage the alveoli, tiny air sacs responsible for gas exchange in the lungs. The particles may also carry carcinogens and other toxic compounds, which adhere to the particle surfaces and can enter the lungs.

Air Pollutant Sources

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Ceres contains a multitude of air pollutant sources. Automobile and truck exhausts, industrial combustion, combustion of natural gas in homes and businesses for space- and water-heating, and evaporation of paints and solvents are typical urban air pollutant sources. Ceres is nearly surrounded by agriculture lands which generate pollutants through equipment and vehicle exhausts, tilling, burning, unpaved road travel, and evaporation of pesticides.

The San Joaquin Valley Unified Air Pollution Control District has permit authority over stationary sources of air pollutants. While there are many smaller permitted sources in Ceres (boilers, industrial equipment, etc.) there are no major permitted sources in Ceres.

8.5.3 REGIONAL AIR QUALITY PLANNING

Federal Air Quality Programs

The U.S. Clean Air Act Amendments of 1977 required that each state identify areas within its borders that do not meet federal primary standards as nonattainment areas (ambient standards are not attained). Stanislaus County is considered nonattainment under the federal Clean Air Act for ozone and PM-10, and the Modesto-Ceres Urbanized Area, which includes all of Ceres, is considered nonattainment for carbon monoxide.

The federal Clean Air Act originally required the preparation of a nonattainment plan showing how the federal standards were to be met by 1987. Stanislaus County was one of many nonattainment areas in California that failed to meet the federal ambient air quality standards by 1987.

The federal Clean Air Act Amendments of 1990 require that new nonattainment plans be prepared and submitted to the U. S. Environmental Protection Agency. The San Joaquin Valley Unified Air Pollution Control District has recently adopted federal nonattainment plans for PM-10 and carbon monoxide; the federal nonattainment plan for ozone is due in November 1994.

State Air Quality Programs

Prior to 1988 there was no timetable for attainment of the state air quality standards. The California Clean Air Act, enacted in 1988, requires local air pollution control districts to prepare air quality attainment plans for ozone and carbon monoxide. Generally, these plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods. The Act also grants air districts explicit statutory authority to adopt indirect source regulations and transportation control measures, including measures to encourage or require the use of ridesharing, flexible work hours, or other measures which reduce the number or length of vehicle trips.

Under the California Clean Air Act, Stanislaus County is considered non-attainment for ozone and suspended particulate (PM-10) and the Modesto-Ceres Urbanized Area, which includes all of Ceres, is considered nonattainment for carbon monoxide. The San Joaquin Valley Air Basin had not exceeded federal CO standards for several years. The State has requested the federal EPA to redesignate the valley for attainment for CO.

The state-required nonattainment plan for ozone and carbon monoxide for the air basin have been adopted and been approved by the State Air Resources Board. The California Legislature, when it passed the Clean Air Act, recognized the relative intractability of the PM-10 problem and excluded it from the basic planning requirement of the law.

The California Clean Air Act of 1988 empowers regional air quality management districts with new authority to design, adopt, implement, and enforce comprehensive plans for attaining and maintaining both the state air quality standards by the earliest practical date. Among its provisions, the California Clean Air Act provides districts with the authority to establish new controls on mobile sources of pollution.

The 1991 *Air Quality Attainment Plan* for the San Joaquin Valley Air Basin identifies 11 Transportation Control Measures (TCMs) as "reasonably available" in the San Joaquin Valley Air Basin. The following TCM's are included in the Plan:

1. Traffic Flow Improvements
2. Public Transit
3. Passenger Rail Support/Facilities
4. Rideshare Program
5. Suburban Park and Ride Lots
6. Bicycling Program
7. Trip Reduction Programs
8. Telecommunications
9. Alternative Work Schedules

The Plan also proposes an indirect source program consisting of three elements:

1. Enhanced District CEQA Participation
2. Incorporation of Air Quality Policies and Programs into Local General Plans
3. New and Modified Indirect Source Review

Air Quality Forecasts

The nonattainment plans developed for the region project future emissions given projected growth in population, employment and industrial activity while accounting for the gradual control of emissions resulting from federal, state and regional air pollution authorities. The nonattainment plans forecast that the Modesto-Ceres Urbanized Area will have attained the state and federal ambient air quality standards for carbon monoxide by the year 1995. However, even with new control measures and technologies coming on line in the next few years, the San Joaquin Valley Unified Air Pollution Control District cannot predict that the ozone or PM-10 standards will be met any time soon.

8.5.4 INCORPORATION OF AIR QUALITY ISSUES IN GENERAL PLANS

The San Joaquin Valley Unified Air Pollution Control District encourages the adoption of land use and circulation strategies, policies, and programs in general plans for cities and counties within the District. The District has published Air Quality Element Guidelines that provide a comprehensive set of goals and policies thought to have air quality benefits as a guideline for cities and counties to address air quality issues. The goals and policies are both specific to air quality and air quality related. The goals and policies are grouped as follows:

1. Communication, Coordination and Cooperation.
2. Land Use, Transportation and Air Quality.
3. Congestion Management/Transportation Control Measures.
4. Toxic and Hazardous Emissions.
5. Fugitive Dust/PM-10.
6. Woodburning.

While adoption of an Air Quality Element or incorporation of air quality goals, policies, and implementation programs is not mandatory for any city or county, inclusion of an acceptable Air Quality Element or equivalent in a general plan is proposed as a prerequisite for the District to delegate authority to cities and counties for conducting any future New and Modified Indirect Source Review programs. The inclusion of air quality goals and policies within a general plan is also likely to facilitate the environmental review of individual projects as general plan goals and policies address cumulative impacts associated with development.

8.6 FINDINGS

- Groundwater quality in the regional groundwater basin has been deteriorating at an accelerating pace over the past two decades. Agricultural irrigation is responsible for the bulk of the groundwater recharge into the regional aquifers. Pesticides and other chemical agents applied during the irrigation process contaminate the recharged groundwater and degrade the quality of the resource. Salts leached from the soils during the irrigation process also enter the groundwater.
- All of the drinking water supplies in the region are derived from groundwater. Irrigation water for the region's agricultural users is delivered via the TID canal system. The City of Ceres operates nine water supply wells within the Study Area boundaries, seven of which are used as potable water supply.
- New groundwater supplies are becoming increasingly difficult to develop. Future groundwater development is unlikely in anticipation of the availability of new surface water supplies from the Tuolumne River. The City is currently instituting a policy which mandates the construction of on-site wells for irrigation of large landscaped areas. When the new Tuolumne River surface water supply becomes available later in this decade, it is anticipated to be relied on solely for drinking water.
- Most of these soils have a Storie index rating between 60 and 100 percent. Soils in this range are considered suitable for a fairly wide range of agricultural crops and have few special management needs. Two of the soil phases (riverwash and terrace escarpments) have Storie index ratings of less than 10 percent. Soils of this class are generally nonagricultural.
- Approximately 73 percent of the soils within the Study Area are classified as Prime Farmland Soils; in contrast, only 12 percent are listed as Farmland of Statewide Importance.
- Agriculture is the predominant land use in the Study Area. The gross agricultural income for Stanislaus County in 1992, the most recent available records, was recently estimated at over one billion dollars. The predominant crop types identified on the DWR maps, at the time of the surveys within the Study Area, were apples, apricots, peaches, plums, almonds, walnuts, corn, beans, pasture and vineyards.
- Five different biotic habitats were observed within the Study Area. These habitats included agricultural, ruderal, urban, riparian forest and freshwater emergent. In general, the native flora of the Study Area has been replaced by a mixture of agricultural, horticultural and non-native annual grasses and forbs. The riparian forests along the banks of the Tuolumne River represent the only continuous expanse of native vegetation.
- Specific surveys were not conducted within the Study Area for areas which met the regulatory definition of "Waters of the United States." However, several areas within the Study Area satisfy the U.S. Fish and Wildlife Service definition of a wetlands.
- The riparian forest along the Tuolumne River is the most biologically important habitat within the Study Area. In the past these areas have been impacted by conversion of lands directly adjacent to and within the riparian corridor to agriculture and urban land uses without regard for riparian buffer zones to protect these sensitive resources. Continued development of this habitat will significantly affect the wildlife species using these areas, and in some cases, may lead to their extirpation within Stanislaus County.
- The valley elderberry longhorn beetle is the only federally-listed species which may occur within the Study Area. Suitable habitat for three additional federal candidate species occurs within the Study Area and includes the delta button celery, Sacramento splittail and southwestern pond turtle. Several California state species of special concern (CSC) are known to occur in the Tuolumne River; these species include river lamprey, chinook salmon, steelhead-rainbow trout, hitch, hardhead, Sacramento squawfish and Sacramento sucker. Several bird species of special concern are either known to occur within the project area or suitable habitat for these species is present within the Study Area. These species include Double-crested Cormorant, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, California Gull, Long-eared Owl, Yellow Warbler and Yellow-breasted Chat. Habitat also occurs in and around Ceres for the Black-shouldered Kite, a fully protected species in the state of California.
- Past efforts by federal, state and local governments have resulted in steady, gradual improvement in air quality in the San Joaquin Valley Air Basin. Despite considerable improvement in air quality over a period of 20 years, however, air quality in Ceres and the greater San Joaquin Valley Air Basin still does not meet all ambient air quality standards, and the latest projections do not show attainment of all ambient air quality standards any time soon.
- Potential future growth in population and employment could have a substantial effect on future air quality. Indirect source controls (site planning, land use or transportation strategies to reduce vehicle trip generation) will become increasingly important in the future.
- The San Joaquin Valley Unified Air Pollution Control District recommends the inclusion of air quality elements or the equivalent in local general plans, and has published Air Quality Element Guidelines to assist in this effort. Use of General Plan goals and policies related to air quality is an integral part of regional programs such as the 1991 *Air Quality Attainment Plan*.

8.7 PERSONS CONSULTED

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8.9 GLOSSARY

Air Pollution - Concentrations of substance found in the atmosphere that exceed naturally occurring quantities and are undesirable or harmful in some way.

Air Quality Standard- The specified average concentration of an air pollutant in ambient air during a specified time period at or above which undesirable effects may be produced. Both national and state standards exist; in general the state standards are the more stringent.

Agricultural Preserve - Land designated for agriculture or conservation (see "Williamson Act").

Agriculture - Use of land for the production of food and fiber, including the growing of crops and/or the grazing of animals on natural, prime, or improved pasture land.

Aquifer - An underground, water-bearing layer of earth, porous rock, sand or gravel, through which water can seep or be held in natural storage. Aquifers generally hold sufficient water to be used as a water supply.

Attainment Area - An area which is in compliance with the National and/or California Ambient Air Quality Standards.

California Clean Air Act - A law setting forth a comprehensive program to ensure that all areas within the State of California will attain federal and state ambient air quality standards by the earliest practicable date. Also known as the Sher Bill or AB-2595, the law mandates comprehensive planning and implementation efforts, and empowers local air pollution control districts to adopt transportation control measures and indirect source control measures to achieve and maintain the ambient air quality standards.

Carbon Dioxide - A colorless, odorless, highly poisonous gas produced by automobile and other machines with internal combustion engines that imperfectly burn fossil fuels such as oil and gas.

CDC - California Department of Conservation

CFS - cubic feet per second

CNPS - California Native Plant Society

Concentration - The amount of an air pollutant present in a unit sample, usually measured in parts per million or micrograms per cubic meter.

DBCP - dibromochloropropane

Endangered Species - A species of animal or plant is considered to be endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes.

FEMA - Federal Emergency Management Agency

Groundwater - Water under the earth's surface, often confined to aquifers capable of supplying wells and springs.

Groundwater Recharge - The process of infiltration and percolation of rainwater from land areas or streams through permeable soils into water-holding rocks that provide underground storage ("aquifers").

Habitat - The physical location or type of environment in which an organism or biological population lives or occurs.

HCI - Hydrologic Consultants Incorporated

Indirect Source Review - A rule or regulation that governs entities such as stationary facilities, buildings, structures, properties and/or roads which, through their construction or operation indirectly contributes to air pollution. This includes projects and facilities that attract or generate mobile source activity (autos and trucks) such as shopping centers, employment sites, schools, and housing developments.

MCL - Maximum Contaminant Level

MID - Modesto Irrigation District

Mobile Sources - Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats, and airplanes.

National Ambient Air Quality Standards - The prescribed level of pollutants in the outside air that cannot be exceeded legally during a specified time in a specified geographical area.

NTCHS - National Technical Committee for Hydric Soils

NGVD - National Geodetic Vertical Datum

Nitrogen Oxide(s) - A reddish brown gas that is a byproduct of combustion and ozone formation processes. Often referred to as NO_x, this gas gives smog its "dirty air" appearance.

Nonattainment Area - Both the State and Federal Clean Air Acts require the California Air Resources Board to designate all air basins within California as attainment, nonattainment or unclassified with respect to the State and National ambient air quality standards. The nonattainment designation indicates that, based on available air quality data, that the standard is currently not being met in the air basin.

Ozone - A tri-atomic form of oxygen (O₃) created naturally in the upper atmosphere by a photochemical reaction with solar ultraviolet radiation. In the lower atmosphere, ozone is a recognized air pollutant that is not emitted directly into the environment, but is formed by complex chemical reactions between oxides of nitrogen and reactive organic compounds in the presence of sunlight, and becomes a major agent in the formation of smog.

Pollutant - Any introduced gas, liquid, or solid whose nature, location, or quantity produces undesired environmental effects.

Rare or Endangered Species - A species of animal or plant listed in: Sections 670.2 or 670.5, Title 14, *California Administrative Code*, or Title 50, *Code of Federal Regulations*, Section 17.11 or Section 17.2, pursuant to the *Federal Endangered Species Act* designating species as rare, threatened, or endangered.

Riparian - The type of environment generally present along watercourses.

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) - An eight county regional district with permit authority over all stationary sources of air pollutants. The District maintains inventories of air pollution sources and monitors air quality with a network of monitoring stations. Under the California Clean Air Act the SJVUAPCD is responsible for the preparation of the regional Clean Air Plan.

SCS - U.S. Soil Conservation Service.

SJVUAPCD - San Joaquin Valley Unified Air Pollution Control District

Special Status Species - Officially designated (rare, threatened, or endangered) and candidate species listed by the California Department of Fish and Game; officially designated (threatened or endangered) and candidate species for listing by the U.S. Fish and Wildlife Service; taxa considered to be rare or endangered under the conditions of Section 15380 of the *State CEQA Guidelines*, such as those identified on lists 1A, 1B, and 2 in the *Inventory of Rare and Endangered Vascular Plants of California*, and other taxa which are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit

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listing or rejection for state or federal status, such as those included on list 3 and 4 in the *California Native Plant Society Inventory* or identified as "Species of Special Concern" by the California Department of Fish and Game.

Stationary Source- A sizeable stationary emission source at a specific location, such as a factory, refinery or power plant.

Study Area - City of Ceres General Plan Study Area (see Chapter 1, Land Use, for a description)

TDS - Total Dissolved Solids

THMFP - trihalomethane formation potential

TID - Turlock Irrigation District

USACE - U.S. Army Corps of Engineers

USFWS - U.S. Fish and Wildlife Service

Watershed - The total area above a given point on a watercourse that contributes water to its flow; the entire region drained by a waterway or watercourse that drains into a lake or reservoir.

Wetlands - Transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. Under a "unified" methodology now used by all federal agencies, wetlands are defined as "those areas meeting certain criteria for hydrology, vegetation, and soils."

Williamson Act - Known formally as the *California Land Conservation Act of 1965*, it was designed to be an incentive to retain prime agricultural land and open space in agricultural use, thereby slowing its conversion to urban and suburban development; the program entails a 10-year contract between the City or County and an owner of land whereby the land is taxed on the basis of its agricultural use rather than the market value; the land becomes subject to certain enforceable restrictions, and certain conditions must be met before approval of an agreement.

APPENDIX 8-A PLANTS OBSERVED WITHIN THE CERES GENERAL PLAN STUDY AREA

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME
ACERACEAE	<i>Acer negundo</i> var. <i>californicum</i>	box elder
ANACARDIACEAE	<i>Schinus molle</i>	pepper tree
	<i>Toxicodendron diversilobum</i>	poison oak
APOCYNACEAE	<i>Oleander</i> sp.	oleander
ASTERACEAE	<i>Baccharis viminea</i>	mulefat
	<i>Carduus pycnocephalus</i>	Italian thistle
	<i>Centaurea solstitialis</i>	yellow star-thistle
	<i>Conyza canadensis</i>	horseweed
	<i>Heterotheca grandiflora</i>	telegraph weed
	<i>Lactuca serriola</i>	prickly lettuce
	<i>Picris echinoides</i>	bristly ox-tongue
	<i>Silybum marianum</i>	milk thistle
	<i>Sonchus oleraceus</i>	common sow-thistle
	<i>Xanthium strumarium</i>	cocklebur
BRASSICACEAE	<i>Brassica nigra</i>	black mustard
	<i>Raphanus sativus</i>	wild radish
CAPRIFOLIACEAE	<i>Sambucus mexicana</i>	blue elderberry
CHENOPODIACEAE	<i>Salsola tragus</i>	Russian thistle
CONVOLVULACEAE	<i>Convolvulus arvensis</i>	field bindweed
CYPERACEAE	<i>Cyperus eragrostis</i>	tall umbrella sedge
	<i>Scirpus californicus</i>	California bulrush
EUPHORBIACEAE	<i>Eremocarpus setigerus</i>	turkey mullein
FABACEAE	<i>Lotus corniculatus</i>	birdsfoot trefoil
	<i>Medicago polymorpha</i>	bur clover
	<i>Melilotus albus</i>	white sweet clover
	<i>Phaseolus</i> sp.	beans
	<i>Trifolium</i> sp.	clover
FAGACEAE	<i>Quercus lobata</i>	valley oak
GERANIACEAE	<i>Erodium moschatum</i>	white-leaf filaræe
GERANIACEAE	<i>Geranium dissectum</i>	cut-leaved geranium
HIPPOCASTANACEAE	<i>Aesculus californica</i>	California buckeye
JUGLANDACEAE	<i>Juglans californica</i> var. <i>hindsii</i>	California black walnut
	<i>Juglans regia</i>	English walnut
JUNCACEAE	<i>Juncus balticus</i>	Baltic rush
	<i>Juncus xiphioides</i>	iris-leaf rush
LAMIACEAE	<i>Marrubium vulgare</i>	horehound mint
LILACEAE	<i>Chlorogalum pomeridianum</i>	soaproot
LYTHRACEAE	<i>Lythrum hyssopifolia</i>	hyssop loosestrife
MALVACEAE	<i>Malva parviflora</i>	cheese weed
MYRTACEAE	<i>Eucalyptus</i> sp.	eucalyptus
OLEACEAE	<i>Olea</i> sp.	olive
ONAGRACEAE	<i>Epilobium paniculatum</i>	panicked willow-herb
PINACEAE	<i>Pinus</i> sp.	pine
PLANTAGINACEAE	<i>Plantago lanceolata</i>	English plantain
PLATANACEAE	<i>Platanus racemosa</i>	California sycamore

POACEAE	<i>Avena barbata</i>	slender wild oat
	<i>Bromus diandrus</i>	ripgut grass
	<i>Bromus hordeaceus</i>	soft chess
	<i>Bromus rubens</i>	foxtail brome grass
	<i>Cryptis schoenoides</i>	swamp timothy
	<i>Cynodon dactylon</i>	Bermuda grass
	<i>Echinochloa crusgalli</i>	barnyard grass
	<i>Elymus triticoides</i>	creeping wild-rye
	<i>Hordeum marinum ssp. leporinum</i>	farmer's foxtail
	<i>Lolium perenne</i>	perennial ryegrass
	<i>Paspalum dilatatum</i>	Dallis grass
	<i>Piptatherum miliaceum</i>	smilo grass
	<i>Polypogon monspeliensis</i>	rabbitfoot grass
	<i>Sorghum halepense</i>	Johnsongrass
	<i>Vulpia myuros</i>	rattail fescue
POLYGONACEAE	<i>Zea mays</i>	corn
	<i>Rumex crispus</i>	curly dock
ROSACEAE	<i>Heteromeles arbutifolia</i>	toyon
	<i>Malus sp.</i>	apple
	<i>Prunus sp.</i>	apricot, peach, plum, almond
	<i>Rosa californica</i>	California rose
	<i>Rubus procerus</i>	Himalayan blackberry
SALICACEAE	<i>Populus fremontii</i>	Fremont cottonwood
	<i>Salix exigua</i>	narrow-leaved willow
	<i>Salix gooddingii</i>	Goodding's black willow
	<i>Salix laevigata</i>	red willow
SIMARUBACEAE	<i>Ailanthus altissima</i>	tree of heaven
SOLANACEAE	<i>Datura meteloides</i>	jimson weed
TYPHACEAE	<i>Typha latifolia</i>	common cattail
	<i>Typha sp.</i>	cattails
UMBELLIFERAE	<i>Foeniculum vulgare</i>	sweet fennel
URTICACEAE	<i>Urtica holosericea</i>	hoary nettle
VITACEAE	<i>Vitis sp.</i>	cultivated grape
The species are arranged alphabetically by family name for all vascular plants encountered during the plant survey. Plants are also listed alphabetically within each family. In some cases it was not possible to accurately identify a particular plant to the species level due to the absence of specific anatomic structures required for identification.		

APPENDIX 8-BLIST OF TERRESTRIAL VERTEBRATE SPECIES KNOWN OR THOUGHT TO OCCUR IN THE CERES GENERAL PLAN STUDY AREA

CLASS: AMPHIBIA

ORDER: SALIENTIA (Frogs and Toads)

FAMILY: BUFONIDAE (True Toads)

Western Toad, (*Bufo boreas*)

FAMILY: HYLIDAE (Treefrogs and Relatives)

Pacific Treefrog, (*Pseudacris regilla*)

FAMILY: RANIDAE (True Frogs)

Bullfrog, (*Rana catesbeiana*)

CLASS: REPTILIA

ORDER: TESTUDINATA (Turtles)

FAMILY: EMYDIDAE (Pond and Marsh Turtles)

Western Pond Turtle, (*Clemmys marmorata*)

ORDER: SQUAMATA (Lizards and Snakes)

SUBORDER: SAURIA (Lizards)

FAMILY: IGUANIDAE (Iguanids)

Western Fence Lizard, (*Sceloporus occidentalis*)Side-blotched Lizard, (*Uta stansburiana*)Coast Horned Lizard, (*Phrynosoma coronatum*)California Horned Lizard (*P.c. frontale*)

FAMILY: SCINCIDAE (Skinks)

Gilbert's Skink, (*Eumeces gilberti*)

SUBORDER: SERPENTES (Snakes)

FAMILY: COLUBRIDAE (Colubrids)

Racer, (*Coluber constrictor*)Gopher Snake, (*Pituophis melanoleucus*)Common Kingsnake, (*Lampropeltis getulus*)Common Garter Snake, (*Thamnophis sirtalis*)

FAMILY: VIPERIDAE (Vipers)

Western Rattlesnake, (*Crotalus viridis*)

CLASS: AVES

ORDER: PODICIPEDIFORMES (Grebes)

FAMILY: PODICIPEDIDAE (Grebes)

Pied-billed Grebe, (*Podilymbus podiceps*)Eared Grebe, (*Podiceps nigricollis*)Western Grebe, (*Aechmophorus occidentalis*)Clark's Grebe, (*Aechmophorus clarkii*)

ORDER: PELECANIFORMES (Tropicbirds, Pelicans, and Relatives)

FAMILY: PHALACROCORACIDAE (Cormorants)

Double-crested Cormorant, (*Phalacrocorax auritus*)ORDER: CICONIIFORMES (Hérons,
Storks, Ibises, and Relatives)

FAMILY: ARDEIDAE (Hérons and Bitterns)

Great Blue Heron, (*Ardea herodias*)Great Egret, (*Casmerodius albus*)Snowy Egret, (*Egretta thula*)Green-backed Heron, (*Butorides striatus*)Black-crowned Night Heron, (*Nycticorax nycticorax*)ORDER: ANSERIFORMES (Screamers,
Ducks, and Relatives)

FAMILY: ANATIDAE (Swans, Geese, and Ducks)

Wood Duck, (*Aix sponsa*)Green-winged Teal, (*Anas crecca*)Mallard, (*Anas platyrhynchos*)Northern Pintail, (*Anas acuta*)

Blue-winged Teal, (*Anas discors*)
 Cinnamon Teal, (*Anas cyanoptera*)
 Northern Shoveler, (*Anas clypeata*)
 Gadwall, (*Anas strepera*)
 American Wigeon, (*Anas americana*)
 Canvasback, (*Aythya valisineria*)
 Redhead, (*Aythya americana*)
 Ring-necked Duck, (*Aythya collaris*)
 Lesser Scaup, (*Aythya affinis*)
 Common Goldeneye, (*Bucephala clangula*)
 Bufflehead, (*Bucephala albeola*)
 Hooded Merganser, (*Lophodytes cucullatus*)
 Common Merganser, (*Mergus merganser*)
 Ruddy Duck, (*Oxyura jamaicensis*)

ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)

FAMILY: CATHARTIDAE (American Vultures)
 Turkey Vulture, (*Cathartes aura*)

FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
 Black-shouldered Kite, (*Elanus caeruleus*)
 Northern Harrier, (*Circus cyaneus*)
 Sharp-shinned Hawk, (*Accipiter striatus*)
 Cooper's Hawk, (*Accipiter cooperii*)
 Red-shouldered Hawk, (*Buteo lineatus*)
 Swainson's Hawk, (*Buteo swainsoni*)
 Red-tailed Hawk, (*Buteo jamaicensis*)
 Ferruginous Hawk, (*Buteo regalis*)
 Rough-legged Hawk, (*Buteo lagopus*)

FAMILY: FALCONIDAE (Caracaras and Falcons)
 American Kestrel, (*Falco sparverius*)

ORDER: GALLIFORMES (Megapodes, Curassows, Pheasants, and Relatives)

FAMILY: PHASIANIDAE (Quails, Pheasants, and Relatives)
 Ring-necked Pheasant, (*Phasianus colchicus*)
 California Quail, (*Callipepla californica*)

ORDER: GRUIFORMES (Cranes, Rails, and Relatives)

FAMILY: RALLIDAE (Rails, Gallinules, and Coots)
 Virginia Rail, (*Rallus limicola*)
 Sora, (*Porzana carolina*)
 Common Moorhen, (*Gallinula chloropus*)
 American Coot, (*Fulica americana*)

ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and Relatives)

FAMILY: CHARADRIIDAE (Plovers and Relatives)
 Black-bellied Plover, (*Pluvialis squatarola*)
 Semipalmated Plover, (*Charadrius semipalmatus*)
 Killdeer, (*Charadrius vociferus*)

FAMILY: RECURVIROSTRIDAE (Avocets and Stilts)
 Black-necked Stilt, (*Himantopus mexicanus*)
 American Avocet, (*Recurvirostra americana*)

FAMILY: SCOLOPACIDAE (Sandpipers and Relatives)
 Greater Yellowlegs, (*Tringa melanoleuca*)
 Lesser Yellowlegs, (*Tringa flavipes*)
 Spotted Sandpiper, (*Actitis macularia*)
 Whimbrel, (*Numenius phaeopus*)
 Long-billed Curlew, (*Numenius americanus*)
 Semipalmated Sandpiper, (*Calidris pusilla*)
 Western Sandpiper, (*Calidris mauri*)
 Least Sandpiper, (*Calidris minutilla*)
 Dunlin, (*Calidris alpina*)
 Long-billed Dowitcher, (*Limnodromus scolopaceus*)
 Common Snipe, (*Gallinago gallinago*)

FAMILY: LARIDAE (Gulls and Terns)

Bonaparte's Gull, (*Larus philadelphia*)
 Ring-billed Gull, (*Larus delawarensis*)
 California Gull, (*Larus californicus*)
 Herring Gull, (*Larus argentatus*)
 Caspian Tern, (*Sterna caspia*)
 Forster's Tern, (*Sterna forsteri*)
 Black Tern, (*Chlidonias niger*)

FAMILY: ALAUDIDAE (Larks)
Horned Lark, (*Eremophila alpestris*)

FAMILY: HIRUNDINIDAE (Swallows)
Tree Swallow, (*Ichthyna bicolor*)
Violet-green Swallow, (*Ichthyna thalassina*)
Northern Rough-winged Swallow, (*Stelgidopteryx serripennis*)
Cliff Swallow, (*Hirundo pyrrhonota*)
Barn Swallow, (*Hirundo rustica*)

FAMILY: CORVIDAE (Jays, Magpies, and Crows)
Scrub Jay, (*Aphelocoma coerulescens*)
Yellow-billed Magpie, (*Pica nuttalli*)
American Crow, (*Corvus brachyrhynchos*)
Common Raven, (*Corvus corax*)

FAMILY: PARIDAE (Titmice)
Plain Titmouse, (*Parus inornatus*)

ORDER: COLUMBIFORMES (Pigeons and Doves)
FAMILY: COLUMBIDAE (Pigeons and Doves)
Rock Dove, (*Columba livia*)
Mourning Dove, (*Zenaidura macroura*)

ORDER: CUCULIFORMES (Cuckoos and Relatives)

FAMILY: CUCULIDAE (Typical Cuckoos)
Greater Roadrunner, (*Geococcyx californianus*)

ORDER: STRIGIFORMES (Owls)

FAMILY: TYTONIDAE (Barn Owls)
Barn Owl, (*Tyto alba*)

FAMILY: STRIGIDAE (Typical Owls)
Western Screech Owl, (*Otus kennicottii*)
Great Horned Owl, (*Bubo virginianus*)
Burrowing Owl, (*Athene cunicularia*)
Long-eared Owl, (*Asio otus*)

ORDER: CAPRIMULGIFORMES (Goatsuckers and Relatives)

FAMILY: CAPRIMULGIDAE (Goatsuckers)
Common Poor-will, (*Phalaenoptilus nuttalli*)

ORDER: APODIFORMES (Swifts and Hummingbirds)

FAMILY: TROCHILIDAE (Hummingbirds)
Black-chinned Hummingbird, (*Archilochus alexandri*)
Anna's Hummingbird, (*Calypte anna*)
Rufous Hummingbird, (*Selasphorus rufus*)

ORDER: CORACIIFORMES (Kingfishers and Relatives)

FAMILY: ALCEDINIDAE (Kingfishers)
Belted Kingfisher, (*Ceryle alcyon*)

ORDER: PICIFORMES (Woodpeckers and Relatives)

FAMILY: PICIDAE (Woodpeckers and Wrynecks)
Acorn Woodpecker, (*Melanerpes formicivorus*)
Red-breasted Sapsucker, (*Sphyrapicus ruber*)
Nuttall's Woodpecker, (*Picoides nuttalli*)
Downy Woodpecker, (*Picoides pubescens*)
Northern Flicker, (*Colaptes auratus*)

ORDER: PASSERIFORMES (Perching Birds)

FAMILY: TYRANNIDAE (Tyrant Flycatchers)
Olive-sided Flycatcher, (*Contopus borealis*)
Western Wood-Pewee, (*Contopus sordidulus*)
Willow Flycatcher, (*Empidonax traillii*)
Hammond's Flycatcher, (*Empidonax hammondi*)
Dusky Flycatcher, (*Empidonax oberholseri*)
Pacific-slope Flycatcher, (*Empidonax difficilis*)
Black Phoebe, (*Sayornis nigricans*)
Say's Phoebe, (*Sayornis sayi*)
Ash-throated Flycatcher, (*Myiarchus cinerascens*)
Western Kingbird, (*Tyrannus verticalis*)

FAMILY: AEGITHALIDAE (Bushtits)

Bushtit, (*Psaltiriparus minimus*)

FAMILY: SITTIDAE (Nuthatches)

Red-breasted Nuthatch, (*Sitta canadensis*)

White-breasted Nuthatch, (*Sitta carolinensis*)

FAMILY: CERTHIIDAE (Creepers)

Brown Creeper, (*Certhia americana*)

FAMILY: TROGLODYTIDAE (Wrens)

Rock Wren, (*Salpinctes obsoletus*)

Bewick's Wren, (*Thryomanes bewickii*)

House Wren, (*Troglodytes aedon*)

Marsh Wren, (*Cistothorus palustris*)

FAMILY: MUSCICAPIDAE (Old World Warblers, Gnatcatchers, Kinglets, Thrushes, Bluebirds, and Wren-tits)

Golden-crowned Kinglet, (*Regulus satrapa*)

Ruby-crowned Kinglet, (*Regulus calendula*)

Mountain Bluebird, (*Sialia currucoides*)

Swainson's Thrush, (*Catharus ustulatus*)

Hermit Thrush, (*Catharus guttatus*)

American Robin, (*Turdus migratorius*)

Varied Thrush, (*Ixoreus naevius*)

FAMILY: MIMIDAE (Mockingbirds and Thrashers)

Northern Mockingbird, (*Mimus polyglottos*)

FAMILY: MOTACILLIDAE (Wagtails and Pipits)

American Pipit, (*Anthus rubescens*)

FAMILY: BOMBYCILLIDAE (Waxwings)

Cedar Waxwing, (*Bombycilla cedrorum*)

FAMILY: LANIIDAE (Shrikes)

Loggerhead Shrike, (*Lanius ludovicianus*)

FAMILY: STURNIDAE (Starlings)

European Starling, (*Sturnus vulgaris*)

FAMILY: VIREONIDAE (Typical Vireos)

Solitary Vireo, (*Vireo solitarius*)

Hutton's Vireo, (*Vireo huttoni*)

Warbling Vireo, (*Vireo gilvus*)

FAMILY: EMBERIZIDAE (Wood Warblers, Sparrows, Blackbirds, and Relatives)

Orange-crowned Warbler, (*Vermivora celata*)

Nashville Warbler, (*Vermivora ruficapilla*)

Yellow Warbler, (*Dendroica petechia brewsteri*)

Yellow-rumped Warbler, (*Dendroica coronata*)

Black-throated Gray Warbler, (*Dendroica nigrescens*)

Townsend's Warbler, (*Dendroica townsendi*)

Hermit Warbler, (*Dendroica occidentalis*)

MacGillivray's Warbler, (*Oporornis tolmiei*)

Common Yellowthroat, (*Geothlypis trichas*)

Wilson's Warbler, (*Wilsonia pusilla*)

Yellow-breasted Chat, (*Icteria virens*)

Western Tanager, (*Piranga ludoviciana*)

Black-headed Grosbeak, (*Pheucticus melanocephalus*)

Blue Grosbeak, (*Guiraca caerulea*)

Lazuli Bunting, (*Passerina amoena*)

Rufous-sided Towhee, (*Pipilo erythrophthalmus*)

California Towhee, (*Pipilo crissalis*)

Chipping Sparrow, (*Spizella passerina*)

Lark Sparrow, (*Chondestes grammacus*)

Savannah Sparrow, (*Passerculus sandwichensis*)

Fox Sparrow, (*Passerella iliaca*)

Song Sparrow, (*Melospiza melodia*)

Lincoln's Sparrow, (*Melospiza lincolni*)

Golden-crowned Sparrow, (*Zonotrichia atricapilla*)

White-crowned Sparrow, (*Zonotrichia leucophrys*)

Dark-eyed Junco, (*Junco hyemalis*)

Red-winged Blackbird, (*Agelaius phoeniceus*)

Tricolored Blackbird, (*Agelaius tricolor*)

Western Meadowlark, (*Sturnella neglecta*)

Yellow-headed Blackbird, (*Xanthocephalus xanthocephalus*)

Brewer's Blackbird, (*Euphagus cyanocephalus*)

Brown-headed Cowbird, (*Molothrus ater*)

FAMILY: EMBERIZIDAE (Continued)

Hooded Oriole, (*Icterus cucullatus*)

Northern Oriole, (*Icterus galbula*)

FAMILY: FRINGILLIDAE (Finches)

Purple Finch, (*Carpodacus purpureus*)

House Finch, (*Carpodacus mexicanus*)

Pine Siskin, (*Carduelis pinus*)

Lesser Goldfinch, (*Carduelis psaltria*)

American Goldfinch, (*Carduelis tristis*)

FAMILY: PASSERIDAE (Weaver Finches)

House Sparrow, (*Passer domesticus*)

CLASS: MAMMALIA

ORDER: MARSUPIALIA (Opossums,

Kangaroos, and Relatives)

FAMILY: DIDELPHIDAE (Opossums)

Virginia Opossum, (*Didelphis virginiana*)

ORDER: INSECTIVORA (Shrews and Moles)

FAMILY: SORICIDAE (Shrews)

Ornate Shrew, (*Sorex ornatus*)

FAMILY: TALPIDAE (Moles)

Broad-footed Mole, (*Scapanus latimanus*)

ORDER: CHIROPTERA (Bats)

FAMILY: VESPERTILIONIDAE (Vespertilionid Bats)

Yuma Myotis, (*Myotis yumanensis*)

California Myotis, (*Myotis californicus*)

Western Pipistrelle, (*Pipistrellus hesperus*)

Big Brown Bat, (*Eptesicus fuscus*)

Red Bat, (*Lasiurus borealis*)

Hoary Bat, (*Lasiurus cinereus*)

Townsend's Big-eared Bat, (*Plecotus townsendii*)

Pale Big-eared Bat, (*P. l. pallescens*)
 Pallid Bat, (*Antrozous pallidus*)

FAMILY: MOLOSSIDAE (Free-tailed Bat)
 Brazilian Free-tailed Bat, (*Tadarida brasiliensis*)

ORDER: LAGOMORPHA (Rabbits, Hares, and Pikas)

FAMILY: LEPORIDAE (Rabbits and Hares)
 Brush Rabbit, (*Sylvilagus bachmani*)
 Riparian Brush Rabbit, (*S. b. riparius*)
 Audubon's Cottontail, (*Sylvilagus auduboni*)
 Black-tailed Hare, (*Lepus californicus*)

ORDER: RODENTIA (Squirrels, Rats, Mice, and Relatives)

FAMILY: SCIURIDAE (Squirrels, Chipmunks, and Marmots)
 California Ground Squirrel, (*Spermophilus beecheyi*)
 Fox Squirrel, (*Sciurus niger*)

FAMILY: GEOMYIDAE (Pocket Gophers)
 Botta's Pocket Gopher, (*Thomomys bottae*)

FAMILY: HETEROMYIDAE (Pocket Mice and Kangaroo Rats)
 San Joaquin Pocket Mouse, (*Perognathus inornatus*)
 San Joaquin Pocket Mouse (*P. i. inornatus*)
 Heermann's Kangaroo Rat, (*Dipodomys heermanni*)
 Merced Kangaroo Rat, (*D. h. dixoni*)

FAMILY: CASTORIDAE (Beavers)
 Beaver, (*Castor canadensis*)

Bobcat, (*Lynx rufus*)

**FAMILY: CRICETIDAE (Deer Mice,
Voles, and Relatives)**
Western Harvest Mouse, (*Reithrodontomys megalotis*)
Deer Mouse, (*Peromyscus maniculatus*)
Dusky-footed Woodrat, (*Neotoma fuscipes*)
Riparian Wood Rat, (*N. f. riparia*)
California Vole, (*Microtus californicus*)
Muskrat, (*Ondatra zibethicus*)

FAMILY: MURIDAE (Old World Rats and Mice)
Black Rat, (*Rattus rattus*)
Norway Rat, (*Rattus norvegicus*)
House Mouse, (*Mus musculus*)

ORDER: CARNIVORA (Carnivores)

**FAMILY: CANIDAE (Foxes,
Wolves, and Relatives)**
Coyote, (*Canis latrans*)
Gray Fox, (*Urocyon cinereoargenteus*)

FAMILY: PROCYONIDAE (Raccoons and Relatives)
Raccoon, (*Procyon lotor*)

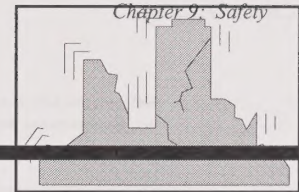
**FAMILY: MUSTELIDAE (Weasels,
Badgers, and Relatives)**
Long-tailed Weasel, (*Mustela frenata*)
Mink, (*Mustela vison*)
Badger, (*Taxidea taxus*)
Western Spotted Skunk, (*Spilogale gracilis [=putorius]*)
Striped Skunk, (*Mephitis mephitis*)
River Otter, (*Lutra canadensis*)

FAMILY: FELIDAE (Cats)



CHAPTER 9

SAFETY



CHAPTER 9 SAFETY

9.0 INTRODUCTION

Jurisdictions planning for future urban growth and development must take into consideration a wide range of public safety issues. Safety hazards may be naturally-induced, such as seismic and geologic, flood, and wildland fire hazards; some hazards may be the result of natural hazards which are exacerbated by human activity and alteration of the natural environment, such as dam failure, urban fire, and development in sensitive areas such as floodplains and areas subject to erosion and landsliding. Some hazards are manmade, including airport crash hazards, hazardous materials, and crime. Many of these hazards can be avoided through locational decisions made at the planning stages of development. The risk associated with some hazards may be lessened through the use of mitigation measures in the planning and land use regulation process.

This chapter inventories and assesses the major hazards confronting Ceres, including seismic and geologic hazards, flooding, wildland and urban fires, airport hazards, hazardous materials incidents, and public safety.

9.1 SEISMIC AND GEOLOGIC HAZARDS

The information in this section provides a preliminary indication of the degree of potential hazard or risk associated with various geologic or seismic zones. There are limits on the use of this information. The maps and text present generalized information, and therefore should be used as general guides to identifying the possible presence of seismic- and geologic-related constraints; they should not be used as the sole basis for project approval or denial.

9.1.1 SEISMIC HAZARDS

Although there are several faults near Stanislaus County, the area has not experienced major seismic activity. Activity on major faults outside Stanislaus County, however, suggests that the Ceres area could be affected by activity in those regions.

To measure the characteristics of an earthquake, the Richter scale is used to measure the magnitude (or strength) of a quake, while the Mercalli Scale is used to measure earthquake intensity. Table 9-1 describes the effects of the 12 levels of the Mercalli Scale. The Mercalli Scale is used to measure the perceived intensity of a quake at a given location, based on types of damage that occur. The Modified Mercalli Scale is a function of the following factors:

- The magnitude and location of the epicenter of the quake;
- The geologic characteristics of an area;
- The groundwater characteristics of an area;
- The duration and character of the ground motion;
- The structural characteristics of a building.

Table 9-1 describes the effects of the 12 levels of the Mercalli Scale and Table 9-2 compares the Richter and Mercalli scales.

TABLE 9-1 MODIFIED MERCALLI SCALE OF EARTHQUAKE INTENSITY

Scale

I.

II.

III.

IV.

V.

VI.

VII.

Effects

Earthquake shaking not felt.

Shaking felt by those at rest

Felt by most people indoors; some can estimate duration of shaking.

Felt by most people indoors. Hanging objects swing, windows and doors rattle, wooden walls and frames creak.

Felt by everyone indoors; many estimate duration of shaking. Standing autos rock. Crockery clashes, dishes rattle, and glasses clink. Doors close, open, or swing.

Felt by everyone indoors and most people outdoors. Many now estimate not only the duration of the shaking, but also its direction and have no doubt as to its cause. Sleepers awaken. Liquids disturbed, some spilled. Small unstable objects displaced. Weak plaster and weak materials crack.

Many are frightened and run outdoors. People walk unsteadily. Pictures thrown off walls, books off shelves. Dishes or glasses broken. Weak chimneys break at rooftop. Plaster, loose bricks, unbraced parapets fall. Concrete irrigation ditches damaged.

Scale
VIII.

IX.

X.

XI.

XII.

Effects

Difficult to stand. Shaking noticed by auto drivers, waves on ponds. Small slides and cave-ins along sand or gravel banks. Stucco and some masonry walls fall. Chimneys, factory stacks, towers, elevated tanks twist or fall.

General fright. People thrown to the ground. Steering of autos affected. Branches broken from trees. General damage to foundations and frame structures. Reservoirs seriously damaged. Underground pipes broken.

General panic. Conspicuous cracks in ground. Most masonry and frame structures destroyed along with their foundations. Some well-built wooden structures and bridges are destroyed. Serious damage to dams, dikes, and embankments. Railroads bent slightly.

General panic. Large landslides. Water thrown out of banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flatland. General destruction of buildings. Underground pipelines completely out of service. Railroads bent greatly.

General panic. Damage nearly total, the ultimate catastrophe. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Source: California Division of Mines and Geology, 1973

TABLE 9-2 APPROXIMATE RELATIONSHIPS BETWEEN EARTHQUAKE MAGNITUDE AND INTENSITY

Richter Scale**Magnitude**

2.0 - 2.9
3.0 - 3.9
4.0 - 4.9
5.0 - 5.9
6.0 - 6.9
7.0 - 7.9
8.0 - 8.9

**Maximum Expected
Intensity (MM)***

I - II
II - III
IV - V
VI - VII
VII - VIII
IX - X
XI - XII

**Distance Felt
(kilometers)**

0
15
80
150
220
400
600

*Modified Mercalli Intensity Scale

Source: United States Geologic Survey, *Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.*

9.12 FAULTS

Faults are indications of past seismic activity. It is assumed that those that have been active recently are the most likely to be active in the future, although even inactive faults may not be "dead." The recency of seismic activity is measured in geologic terms. Geologically recent is within the past two million years (the Quaternary period). All faults believed to have been active during the Quaternary time are considered "potentially active." Those that have exhibited activity within the last 11,000 years are considered "active."

Figure 9-1 illustrates the general location of faults in the vicinity of Ceres. Seismic activity on these faults has the greatest potential for causing damage in the Ceres area. Seismic activity in other parts of the state can also affect the Study Area, but the potential impacts are not as great. There are no known faults within the valley portion of Stanislaus County; the only known fault is in the far western portion of the county in the Diablo Mountains.

San Andreas Fault Zone

The San Andreas Fault is one of the longest, most thoroughly studied, and most active faults in the world. The fault trace extends over 600 miles from its southern point in the Gulf of California to the Cape Mendocino in Northern California. The 1906 San Francisco earthquake (estimated Richter magnitude 8.3) and produced moderately intense groundshaking in the San Joaquin Valley. More recently, the Loma Prieta earthquake (Richter magnitude 7.1) occurred along the southern Santa Cruz mountains segment of the San Andreas Fault, and was also felt in Stanislaus County.

Some sections in the Central Coast Ranges are creeping at rates as great as 3.5 centimeters per year. Other segments, north and south of the creep areas, exhibit no detectable movement. The portion of the fault in those areas appears to be temporarily "locked." It is generally agreed that a "locked" condition allows stresses to accumulate more rapidly, thus shortening the time between major earthquakes.

The San Andreas Fault Zone is divided into discrete segments on the basis of historic seismicity and ground surface rupture. Segments of the San Andreas Fault Zone capable of generating earthquakes that could affect the Stanislaus County include the North Coast segment, the San Francisco-Peninsula segment, and the southern Santa Cruz Mountains segment. It is generally accepted that moderate to great earthquakes will take place along the San Andreas Fault in the foreseeable future, with a maximum credible earthquake of 8.3 to 8.5 Richter magnitude. The recurrence interval for an earthquake of this magnitude is not well defined, but is estimated to be in the range of 100 to 300 years. A major earthquake along this fault at this magnitude could cause serious damage in Stanislaus County.

Hayward Fault

The Hayward Fault is located east of San Francisco Bay and extends southeast to where it probably merges with the Calaveras Fault north of Hollister. A review of the recent history of this fault shows two major earthquakes (1836 and 1868), each with an estimated Richter Scale magnitude of 6.5 to 7.5. Current measurements indicate creeping at rates up to one centimeter per year in places. Numerous small earthquakes (Richter Scale magnitude of 3 to 5) have occurred along this fault in recent years. The maximum credible earthquake along the Hayward fault is estimated to Richter magnitude 7.5. Studies by the U.S. Geological Survey estimated a 28 percent probability that the Hayward Fault would experience an earthquake of Richter magnitude 6.5 to 7.0 within the next 30 years.

Calaveras Fault

The Calaveras Fault borders the eastern flank of the Berkeley-Hayward Hills, and extends to the southeast. Epicenters of recent earthquakes of Richter Magnitude of 6 have been located along or near this fault southeast of San Jose in 1979 and 1984. In 1868, an earthquake of unknown magnitude caused ground breakage near Danville. Several centimeters of creep have been measured in Hollister, where a Calaveras Fault trace cuts through a residential area. The maximum credible earthquake along this fault is estimated to be Richter magnitude 6.5 to 7.5.

Green Valley-Concord Faults

This fault zone, extending from Walnut Creek to west of Fairfield, has experienced displacement along most of its length within recent geologic time. An earthquake of 5.4 magnitude occurred in 1955 along part of this fault near Concord. There is currently evidence of some movement along the fault near Concord. The greatest probable earthquake generated by this fault system is not expected to exceed a magnitude of 6.7 on the Richter scale.

Midland Fault

The Midland Fault, buried under recent alluvium, extends north from Bethel Island in the Delta to east of Lake Berryessa. Its activity is not as well documented as the faults discussed previously. There is evidence, however, that fault displacement has occurred during recent geologic time. The State Division of Mines and Geology believes that the Midland Fault is a possible source of a major earthquake centered in Vacaville in 1892 (Richter magnitude 6.8). The maximum probable earthquake on this fault is estimated to be 7.0.

Patterson Pass Fault

The Patterson Pass Fault runs northwest from the Alameda/San Joaquin County boundary toward Livermore. Its location is imprecise and the nature of movement, if any, is uncertain. The fault is cited because of one well-located epicenter generating a 4.5 magnitude earthquake in 1946.

Tesla-Ortogonal Fault

The Tesla Fault is described as a northwest extension of the Ortogonal Fault. Within the Diablo Mountain Range, the most recent movements along this fault were approximately five million years ago, although earthquake activity without surface fracturing or faulting is still common. In fact, the fault system is active in producing minor tremors. Active seismicity has been identified along some segments of the fault zone. A Richter magnitude 5 earthquake in 1926, a magnitude 3.7 in 1981, and smaller earthquakes monitored from 1969 to 1980 occurred in the vicinity of this fault zone. According to a report produced by the California Division of Mines and Geology at the end of 1991, the Tesla-Ortogonal fault zone was determined to have no known damaging earthquakes. The fault zone is considered capable of generating earthquakes of Richter magnitude 6.5 to 6.75. The recurrence of earthquakes resulting in surface rupture is on the order of 5,000 to 10,000 years for the entire fault zone. Only one earthquake of any significance has been recorded in Stanislaus County. It was rated 4.6 on the Richter scale and was located on the county's west side along the this fault in 1946.

Bear Mountain and Melones Faults

These faults run roughly parallel to each other, along the foot of the Sierra Nevada range, approximately 25 to 30 miles from Ceres in the extreme east portion of the county. The fault zones, which consist of numerous discontinuous segments, extend from east of Red Bluff south the southeast of Yosemite National Park. Extensive studies of the fault system indicate that faults within the system have been active in the past 100,000 years and activity in the past 10,000 years cannot be precluded. Portions of the fault system have been zoned active under the Alquist-Priolo Act. Individual segments with the system are considered capable of generating a maximum probable earthquake of Richter magnitude 6.5 to 6.8. The August 1975 Oroville earthquake (Richter magnitude 5.7) occurred along this fault system.

9.1.3 GROUNDSHAKING

The most serious direct earthquake hazard is the damage or collapse of buildings and other structures caused by groundshaking which, in addition to property damage, can result in injury or death.

Groundshaking is the vibration which radiates from the epicenter of an earthquake. Damage to structures from groundshaking is caused by the vibration or shaking, and its potential impact on buildings and other urban development is determined by several factors:

- The nature of the underlying materials, including rock and soil;
- The structural characteristics of a building;
- The quality of workmanship and materials used in its construction;
- The location of the epicenter and the magnitude of the earthquake; and
- The duration and character of the ground motion.

The effects of groundshaking can be damaging well beyond the fault trace that generates the shaking. For example, the segment of the San Andreas fault which caused the great damage and destruction in San Francisco in 1906 was offshore, beyond the Golden Gate. This earthquake was also felt in Stanislaus County; several of the buildings in Modesto suffered minor structural damage.

Most of Ceres is located on alluvium deposits of varying depths, which can increase the potential for groundshaking damage. As earthquake waves pass from more dense rock to less dense alluvial or water-saturated materials, they tend to reduce in velocity, and increase in amplitude. Ground motion lasts longer on loose, water-saturated materials than on solid rock. As a result, structures located on these types of materials suffer greater damage than those located on solid rock. "Poor ground" can be a greater hazard for structures than close proximity to the fault or epicenter.

Groundshaking is the primary seismic concern for the city of Ceres. Ceres will experience the groundshaking effects of earthquakes, although the risk associated with this hazard in the Ceres area is low based on historical evidence of earthquake effects in Ceres. The California Division of Mines and Geology has produced a maximum expected earthquake intensity map which shows Ceres in the low severity zone. This zone could potentially experience groundshaking intensities of up to VI-VII in Mercalli intensity. The city borders on a moderate severity zone, which lies to the west of Ceres. This zone may experience maximum expectable groundshaking intensities of VII-VIII on the Mercalli Scale. Historic records suggest, however, that the probability of these maximum events occurring is very low.

The state earthquake protection law (*California Health and Safety Code §19100 et seq.*) requires that buildings be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum requirements are spelled out in the *Uniform Building Code*, which can be modified as necessary to meet local needs. The extent of groundshaking that buildings are designed to resist is based on the seismic zone in which they are located. Of the four seismic zones used nationwide, California includes the two zones of highest potential seismicity, Zones 3 and 4, with Zone 4 the most seismically active. Boundaries of the zones are determined by proximity to a fault considered capable of generating an earthquake of 6.0 to 7.0 magnitude or greater. The General Plan Study Area is located entirely within Zone 3.

Older buildings constructed before building codes were in effect, and even newer buildings constructed before earthquake resistance provisions were included in the current building codes, are the most likely to suffer damage in an earthquake. Most of Ceres' buildings are one or two stories high, and are of wood frame construction, which is considered the most structurally resistant to earthquake damage.

Older masonry buildings without earthquake-resistant reinforcement are the most susceptible to the sort of structural failure which causes the greatest loss of lives. The susceptibility of a structure to damage from earthquake groundshaking is also related to the foundation material underlying the structure. A foundation of rock or very firm material intensifies short period motions, which affect the low-ridged buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium may cushion low-ridged buildings, but accentuate the motion in tall buildings. The amplified motion resulting from softer alluvium soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include building projections which are not firmly anchored, such as parapets and cornices. These projections could collapse during periods of strong and/or sustained groundshaking.

Building codes are the primary tool governments possess to reduce seismic risk in structures. The City of Ceres has adopted the *Uniform Building Code*; all new buildings in the city must meet the seismic requirements of the 1991 edition of the *Uniform Building Code*. Critical facilities, such as hospitals and fire stations, should be sited, designed, and constructed to withstand severe groundshaking.

Older structures which do not conform to the *Uniform Building Code*, are dealt with according to the provisions of the City's *Dangerous Building Code*, which is a component of the *Uniform Building Code*. The *Dangerous Building Code* defines procedures for determining acceptable levels of risk in older structures. Hazardous buildings in the city are generally brought to the City's attention through filed complaints. Building owners are given a certain period of time within which to either demolish or rehabilitate the building.

Fire can also be a secondary earthquake hazard resulting from groundshaking effects. Most earthquake-induced fires start because of ruptured power lines, damage to wood, gas, or electrical stoves, and damage to other gas or electrical equipment. Firefighting ability can be hindered by buildings constructed of combustible materials, damage to a community's firefighting facilities, and rupture of water mains. This points out the need for greater emphasis on non-combustible material and on special construction techniques so that water mains will remain unbroken during large earthquakes.

9.1.4 GROUND FAILURE

In addition to structural damage caused by groundshaking, there are other ground effects caused by the shaking. These are known as ground failure effects and include liquefaction, settlement, lateral spreading, lurch cracking, and earthquake induced landslides.

Liquefaction is the loss of soil strength due to seismic forces acting on water-saturated granular soils. This loss of strength leads to a "quicksand" condition which causes many types of ground failure. When the liquefied granular layer occurs at the surface, objects can either sink or float, depending on their density. The evaluation of potential for liquefaction is complex and must consider soil type, soil density, groundwater table, and the duration and intensity of shaking. Liquefaction is most likely to occur in deposits of weak saturated alluvium or similar deposits of artificial fill.

Liquefaction potential within Ceres exists in low-lying areas composed of unconsolidated, saturated, clay-free sands and silts. The expected degree of groundshaking required to induce liquefaction is fairly high. Since there is no historical evidence to suggest that high groundshaking intensities are common, the risk of liquefaction in the Ceres area is relatively low. Evaluation of liquefaction potential should be conducted on a site-by-site basis; soil reports are a requirement for new development under the Subdivision Map Act.

Settlement, or subsidence, is the compaction of soils and alluvium caused by groundshaking. It occurs irregularly and may be partly controlled by bedrock surfaces, and old lake, slough, swamp, and stream beds. The amount of compaction may range from a few inches to several feet. Irregular compaction is most widespread and extreme in major earthquakes. It may occur as much as 75 to 80 miles from the epicenter and may amount to several feet even at that distance. Compaction is most likely to occur in areas, such as Ceres, which are underlain by soft water-saturated low-density alluvial material. However, there are no significant subsidence problems in the Study Area.

Lurch cracking refers to fractures, cracks, and fissures produced by groundshaking, settling, compaction of soil, and sliding, and may occur many miles from the epicenter of an earthquake. These effects are characteristic of earthquakes large enough for significant ground motion to occur. The large the earthquake magnitude, the more extensive the effects. Thus, a major earthquake may damage streets, curbs, sewer, gas, and water lines.

Lateral spreading is the horizontal movement or spreading of soil toward an open face such as a stream bank, the open side of fill embankments, or the sides of levees. Artificial fill areas which are improperly engineered or which have steep, unstable banks are most likely to be affected.

The potential for lurch cracking and lateral spreading is highest in areas where there is a high groundwater table, relatively soft and recent alluvium deposits, and where creek banks are relatively high. Fracture patterns from lurch cracking and lateral spreading may be controlled by the configuration of shallow bedrock structures, by highway surfacing, by the margins of fill, and engineering structures.

Earthquakes can also cause landsliding and slumping. Ceres is mostly level, so landsliding and slumping should not be problems, except along the steep banks of the Tuolumne River.

9.1.5 SEICHES

Seiches are earthquake-generated waves within enclosed or restricted bodies of water. Major, and even moderate earthquakes, miles away from Ceres can produce oscillations or waves in local bodies of water which could overtop and damage levees and cause water to inundate surrounding areas.

Since there are no lakes or reservoirs in or near Ceres, seiche hazards do not exist in the city.

9.2 FLOOD HAZARDS

Flooding has been a recurring problem throughout the history of Stanislaus County. Three major floods have taken place in the last 30 years. The biggest flood in the county's history occurred in 1861, and covered the valley with a body of water 250 to 300 miles long and 20 to 60 miles wide). Today, the potential for such major flooding in Ceres is quite remote, due to the construction of the Don Pedro Dam on the Tuolumne River.

Smaller, localized flooding on the Tuolumne River north of Ceres, as well as a sudden high rise on Dry Creek could affect the northernmost part of the Study Area.

The primary effects of flooding are caused by the initial force of flood waters which can shatter structures and uplift vehicles. Floodwaters can carry large objects downstream which have the force to remove stationary structures. Saturation of materials and earth can cause instability, collapse, and damage. Objects can be buried through sediment deposition. Floods can cause drowning or isolation of persons and animals. Floodwaters can break utility lines, interrupting services and potentially affecting health and safety, particularly in the case of broken sewer or gas lines.

The secondary effects of flooding are due to standing water. Standing water can result in loss of crops, septic tank failure, and water well contamination. Standing water can also damage roads, foundations, and electrical circuits.

9.2.1 100-YEAR FLOOD HAZARD

The 100-year flood is the flood event that has a one percent chance of occurring in any given year. This type of flood is expected to occur every 100 years on average. This is considered to be a severe flood, but one with a reasonable possibility of occurrence for purposes of land use planning, property protection, and human safety. The Federal Emergency Management Agency (FEMA) prepares maps showing areas which are likely to flood during a 100-year flood event. Figure 9-2 shows the 100-year floodplain in the Study Area. The only part of Ceres located within the 100-year floodplain is the River Oaks Golf Course, so the City has chosen not to participate in the National Flood Insurance Program.

9.2.2 DAM FAILURE INUNDATION

The risk of dam failure is remote. Dam failure can occur under three general conditions: earthquake, structural instability, or an intense rainfall in excess of a dam's holding capacity. According to the *Stanislaus County General Plan*, Ceres is not within the inundation areas for New Melones or Tulloch Dams. Widespread flooding would occur along both sides of the Tuolumne River in the event of the failure of the dam on the Don Pedro Reservoir, but would not significantly affect the Ceres General Plan Study Area. The flooding area would be limited to the northernmost part adjacent to the Tuolumne River, similar to what would occur in a 100-year flood event. Since much of Stanislaus County would be affected by dam failure inundation, however, Ceres would be a logical area for assisting other cities and agencies that would be affected by such flooding in the event of dam failure.

9.3 FIRE HAZARDS

Ceres faces two types of fire hazards that threaten life and property: urban and wildland fires. While urban fires may result in injuries and loss of property, wildland fires may result in loss of natural vegetation, loss of agricultural crops, erosion of soil and the intrusion of eroded soil into lower lying areas. Public protection classifications are designated by the Insurance Services Office (ISO). The ISO bases its classifications on a number of factors, including fire department location, equipment, and staffing; water supply; and communications abilities. Ratings range from 1 to 10, with 1 being the best possible fire protection, and 10 being the worst. The City of Ceres maintains an ISO rating of 4, while the outlying areas maintain a rating of 9.

9.3.1 URBAN FIRES

Urban fires are primarily those associated with commercial, industrial, and residential structures and the activities in and around them. Most urban fires are caused by human activity. Over the years, development standards have become more stringent in order to reduce the frequency and severity of such fires. Building codes have been revised to utilize the most up-to-date construction methods in an attempt to make new buildings as safe as possible. Fire walls are now required when structures are built close together or near a property line. Electrical standards have also changed in order to contribute to safer construction.

Urban fire hazards in Ceres are greatest in areas containing older buildings which do not meet current building codes. As part of the City's dangerous building abatement program, however, hazardous buildings which are brought to the City's attention are either torn down or retrofitted to meet the current fire and other safety codes. New structures are required to have heat or smoke detectors installed in strategic locations throughout the building.

9.3.2 WILDLAND FIRE HAZARDS

The outbreak and spread of wildland fires in the Study Area is a potential danger, particularly during the summer months. The buildup of understory brush which under natural conditions would be periodically burned off creates conditions conducive to larger and more intensive fires.

Variable conditions such as humidity, drought, rainfall, wind velocity, type and presence of vegetation, and fuel buildup are the main determinants to the start, spread, and control of wildland fires. The annual drought season (May to October) gives rise to the most hazardous fire conditions, particularly in the latter months. It should be noted that most wildland fires in California are the result of either arson or simple human carelessness.

The hot, dry summers in Stanislaus County produce large areas of extremely dry vegetation often located in areas where the topography enhances the spread of flames and prohibits access for fire fighting equipment. The existence of people in these areas increases the chances of fire. The riverbluff areas north of the city pose a fire hazard during periods when dry grass and brush exist.

The primary wildland fire hazard in Ceres is the river bluff area in northern Ceres, particularly during the summer months, when the vegetation along the Tuolumne River bluffs is dry.

9.3.3 OTHER FIRE HAZARDS

Other threats to fire safety involve all of the non-structural items found in buildings, particularly in residences. These items include home furnishings, office equipment, synthetic fibers, plastics, household products, hazardous materials, and appliances. Lack of knowledge about materials which are combustible, and product or structural designs which increase fire risk tend to exacerbate fire risk.

Utility facilities also constitute potential fire hazards in Ceres. Buried gas lines and overhead electrical power lines can start fires if they break or come down. Major earthquakes, although less likely to occur than a human-induced event, can rupture gas lines or storage tanks, causing severe explosions and fire over a widespread area.

9.3.4 FIRE PREVENTION AND SUPPRESSION

The Ceres Department of Public Safety, Emergency Services Division not only provides fire protection to the city, but also to the Ceres Fire District and part of the Industrial Fire District. Fire prevention facilities and organization is discussed in greater detail in Chapter 6, *Public Facilities and Services*.

The City has experienced rapid growth in the last few years, and as a result, facilities improvements are needed. The Division of Emergency Services has submitted a six year capital improvement plan to the City which delineates Department improvement objectives for the mid-1990s. Major elements of the plan include the construction of second and third satellite fire stations in east and west Ceres, acquisition of a fourth existing fire station in the north, and an increase in staff size. Acquisition of part of the Industrial Fire District resulted in the additional north fire station and some additional staff.

The major fire prevention programs carried out by the Division of Emergency Services includes:

- Community education programs;
- Systematic inspections of schools, churches and day care centers;
- Alley and vacant lot inspection on a semi-annual basis;
- Fire Prevention Bureau maintains a data base of information on the location and type of hazardous materials; and
- Review and analysis of subdivision plans.

The City's Public Improvement Standards address fire hydrant installation as follows:

- Fire hydrant spacing should be, at minimum, 300 feet in residential and commercial areas; in no case should the average coverage of each hydrant be more than 120,000 square feet. Fire hydrants should be located at street intersections rather than in the middle of blocks; this permits flow from at least two and usually three separate source lines, thus increasing hydrant potential.
- Hydrants should be installed with 6-inch lead lines connecting to 6-inch or larger mains.
- All hydrants should have independent valves between the hydrant and the main.
- All hydrants should have two 2½ inch hose opening and a 4½ inch pumper opening. All hydrants shall conform to the standards of the National Board of Fire Underwriters.

9.3.5 MUTUAL AID

Because Ceres, and other nearby communities, do not have the resources to effectively handle all potential fire-related emergency situations, area fire departments and police departments have increasingly utilized mutual aid agreements and plans. The magnitude, complexity and frequency of various emergencies throughout California has placed greater emphasis on coordinated plans. The framework for mutual aid is based on each local jurisdiction exhausting its own resources prior to calling for assistance from its neighbors. When the Director of Public Safety, Division Commanders, and/or Incident Commander determines that an emergency situation may become or is already beyond the control of the Department's resources, it is the Director of Public Safety or Division Commander's responsibility to request mutual aid from back-up departments in the area.

Communication and coordination among emergency service personnel has been underway for a number of years and it is evident that the City will continue to maintain levels of safety as high, or higher than the present levels.

9.4 AIRCRAFT CRASH HAZARDS

Safety issues associated with airports are primarily concerned with hazards posed to flight and hazards posed to those on the ground. Flight hazards may be physical, such as tall structures that would obstruct airspace; visual, such as the glare caused by lights; or electronic, which could include any electronic uses that interfere with aircraft instruments or communication systems. With urban growth comes the need for increased airport operations; increased activity generates increased aircraft crash hazards. However, with proper land use planning, these risks can be reduced or mitigated, mainly through avoidance of incompatible land uses.

Although there are no airports in the City of Ceres, the Modesto City-County airport is located just north of Ceres, in Modesto. In 1989, annual operations at the airport were 115,191. The facility has two runways, and utilizes an instrument landing system (ILS). Major improvements were recently made in order to accommodate jet aircraft. The facility's service area includes all of Stanislaus County, but primarily the Modesto/Ceres area. Operations at this airport have the potential to affect Ceres, particularly where Ceres' sphere of influence extends into the airport's traffic patterns and approach zones.

The *Modesto City-County Airport Master Plan Report*, adopted 1990, serves as a long-range guide for development of the airport and surrounding vicinity. According to the plan, "the airfield has adequate capacity to serve projected demand and is in good condition." The area south (south of the Tuolumne River) and southeast of the airport lies partially within Ceres' city limits and sphere of influence. These areas are within the airport's traffic zones, and portions lie within the approach zones to the most active runways. The City of Ceres has adopted an Airport Overlay zone which limits the height of structures and other land use characteristics which constitute a hazard to flight. Chapter 1, *Land Use*, contains a description of the airport plans and relevant land use issues in this area.

The *Airport Master Plan* identifies several additional measures for ensuring safety in these areas of concern, including the following.

- Land acquisition
- Approach protection easements/Purchase of development rights
- Dedication of navigation easements
- Land use designations
- Development restrictions
- Airport combining zone
- Buyer awareness programs
- Real estate disclosure statements

9.5 HAZARDOUS MATERIALS

Hazardous waste is defined as any waste material that is a potential threat to human health and environment, having the capacity to cause serious illness or death (*Health and Safety Code §25117*). In any urbanized environment, hazardous waste and its safe handling and disposal is an issue that must be addressed.

Stanislaus County generates approximately 12,100 tons of hazardous waste each year, constituting 0.12 percent of all hazardous waste generated in California. Of this figure, 7,400 tons are transported outside the county, and 4,700 tons are either treated on-site, recycled, discarded into the environment, or disposed of in sewer systems. Waste oil is the largest category of waste generated in the county. Household hazardous waste (e.g. used paint, pesticides, cleaning products, and other chemicals) constitutes approximately 0.19 percent of the hazardous wastes in Ceres.

9.5.1 HAZARDOUS WASTE MANAGEMENT PLAN

Counties are required by state law to prepare hazardous waste management plans. The Stanislaus County *Hazardous Waste Management Plan* (HWMP), August 1993, addresses the treatment, storage, and disposal of hazardous waste in Stanislaus County. The major goal of the plan is to protect public health and environment by promoting the safe use and disposal of hazardous waste. To accomplish this, the plan provides for the reduction of hazardous waste in the county through source reduction, recycling, and on-site treatment methods. Public education and community involvement are key features for obtaining this goal.

The Stanislaus County HWMP also determines suitable sites throughout the county for treatment, storage, and disposal facilities. Siting is to be based on a regional "fair-share" policy, whereby facilities are sited according to a region's contribution to the hazardous waste stream. Potential sites must be conducive to the safe management of hazardous waste (e.g., no high water table, no nearby residences, no sensitive habitats or natural resource areas). All of the sites identified are in industrially zoned areas. The plan concludes that no new treatment or residual repository facilities are needed, but that a storage or transfer facility may be needed in the near future.

One of the areas identified by the HWMP as potentially suitable for use as hazardous waste management facilities is a large area in the eastern part of the Study Area. This includes a large industrially-zoned area west of State Route 99 and east of Crows Landing Road, as shown in Figure 9-3.

9.5.2 TRANSPORT OF HAZARDOUS MATERIALS

The transport of hazardous waste is also addressed in the HWMP. Many tons of hazardous wastes traverse California's highways each year. Appropriate measures must be taken to ensure safety to the communities through which they pass, and the natural environment. State Route 99, which passes through the urbanized portion of Ceres, is a main north-south route for the state (in addition to Interstate 5). Many thousands of tons of hazardous materials traverse this roadway every year. The HWMP identifies routes which may serve as connector routes between Interstate 5 and State Route 99. Of particular concern to Ceres is Crows Landing Road. In addition to these routes, there are two railroads that pass through the city, which also serve as hazardous materials transport routes: Union Pacific Railroad, located to the west of the city limits, runs in a north-south direction; and the Southern Pacific Railroad runs adjacent to State Route 99.

9.6 EVALUATION OF ENVIRONMENTAL RISKS

Table 9-3 identifies those natural and manmade disasters which may impact Ceres residents. Table 9-3 also identifies the level of risk for each hazard and the geographical implications in the event of environmental upset. Each potential hazard to the public safety and welfare has been assessed according to the following levels of risk:

- Low risk - The level of risk below which no specific action is deemed necessary. The occurrence of a specific event is unlikely.
- Medium Risk - The level of risk above which specific action is required to protect life and property, although the probability of the event taking place is low to moderate.
- High Risk - Risk levels are significant and occurrence of a particular emergency situation is highly probable or inevitable.

The "scope of risk" refers to the geographic area that could be potentially affected with the occurrence of one of the hazards. The scope of risk includes three levels:

- Local: The affected geographic area that is directly affected is localized or site specific.
- Citywide: The affected area includes a significant portion or all of the city.
- Regional: The affected area includes the entire city as well as the surrounding region.

The State Office of Emergency Services (OES) has established three levels of emergency response to peacetime emergencies, which are based on the severity of the situation and the availability of local resources in responding to that emergency. The three levels of emergency response include:

- Level 1: A minor to moderate incident wherein local resources are adequate to deal with the emergency.
- Level 2: A moderate to severe emergency where local resources are not adequate to deal with the emergency and mutual assistance would be required on a regional or statewide basis.

- Level 3: A major disaster where local resources are overwhelmed by the magnitude of the disaster and State and Federal assistance is required.

Finally, "event duration" refers to the length of occurrence for a particular event. The residual effects of a particular event are taken into consideration in the environmental risk assessment although they may be long term in nature. An earthquake, for example, may only last for several seconds, but aftershocks may continue for many days, months, or in some instances even years. Fault displacement may result in permanent alterations in topography. Finally, property damage may be so extensive that complete recovery may take years. The following three categories are used in the classification of event duration:

- Immediate: The occurrence of a particular event is instantaneous or measurable in terms of seconds or minutes.
- Short-term: The duration of a particular event is generally measured in terms of hours or days.
- Long-term: The duration of a particular event extends for a much longer period of time. Specific hazards that are considered continuous or on-going are included in this category.

TABLE 9-3 ENVIRONMENTAL RISK ASSESSMENT FRAMEWORK

Environmental Hazard	Potential of Occurrence			Scope of Risk			Emergency Energy Response			Event Duration		
	Low	Medium	High	Local	City	Regional	Level 1	Level 2	Level 3	Immediate	Short Term	Long Term
Earthquake		x				x		x			x	
Surface Rupture	x			x				x		x		
Liquefaction	x			x				x		x		
Groundshaking		x			x	x		x	x	x		
Slope failure	x			x			x				x	
Landslide	x			x			x				x	
Flooding	x			x		x	x				x	
Local ponding		x		x			x				x	
50-year flood	x					x		x			x	
100-year flood	x					x		x			x	
Fire												
Urban		x		x			x	x		x		
Wildland	x			x			x	x		x		
Industrial		x		x			x	x		x		
Chemical		x			x		x	x		x		
Gas main	x			x			x	x		x		
Subsurface	x			x			x	x		x		
Chemical Contamination												
Road Spill			x	x			x	x		x		
Subsurface		x			x			x				x
Radiological	x				x	x		x	x			x
Major Accident												
Industrial		x		x	x		x	x		x		
Major road			x	x	x		x	x		x	x	
Aircraft		x		x			x	x		x		
Railway		x		x			x	x			x	
Water Shortage		x			x	x		x	x		x	

Source: City of Ceres General Plan, *Safety Element*, September 1990.

9.7 PUBLIC SAFETY

Crime is a complex social phenomena, the causes and effects of which are beyond the scope of the General Plan. The purpose of including this section on crime in the Safety chapter is to acknowledge that there is a definite relationship between crime and the physical design and layout of the community, and to discuss mechanisms that may be utilized for incorporating crime safety into the existing urban environment and the development process of the community.

9.7.1 DEFENSIBLE SPACE

Sociologists and criminologists have offered innumerable theories about the causes of crime and the fear of crime in our society. It is clear that law enforcement alone cannot solve these problems. In recent years, there has been growing interest and research into the relationship between physical design and criminal activity. Defensible space is a concept used to describe this relationship. The term denotes an environment whose physical characteristics -- building layout and site plan -- function to allow occupants themselves to become the key agents in ensuring their own security. Defensible space techniques are currently being utilized by the Department of Public Safety in assisting private developers to design crime resistant projects and structures in the community.

Criminal activity in Ceres has been primarily focused on property, rather than people. Criminal activity will tend to grow with a growing city population if proactive programs to combat crime are not implemented. The Department of Public Safety promotes and supports various crime prevention programs, including neighborhood watch programs and promotion of defensible space through project design and review.

There still remains a more difficult set of problems to resolve that can only be attacked with positive programs for recreation, reduction of poverty levels, and provisions for jobs and, where necessary, family assistance in order to reduce the necessity for persons to engage in criminal activity.

9.8 EMERGENCY RESPONSE

Disasters can occur at any time and take many forms ranging from a major earthquake to a hazardous material spill, and may threaten both property and life. Potential disasters in Ceres include the following: PG&E gas line breakage, railroad derailments, freeway vehicular accidents, a break in the jet propulsion fuel line adjacent to the Southern Pacific rail line, and a hazardous material spill within or near the city.

The goal of the City of Ceres is to have a realistic assessment of the potential for a disaster and plans for recovery after a disaster has occurred. Due to the large number of public, quasi-public, and private agencies involved in emergency preparedness planning and their differing areas of responsibility, cooperation and coordination between entities is essential.

Communication is the critical element in emergency response capability. Cities, emergency and safety agencies, water districts, utilities, and other involved private agencies must be able to remain in contact in order to coordinate the provision of supplies and personnel. To this end, it is imperative that regular and effective on-going organizational meetings be held in order to assure the efficient and responsive provision of emergency services and supplies.

9.8.1 MULTI-HAZARD FUNCTIONAL PLANNING

The development of a carefully conceived emergency preparedness plan includes a disaster operations plan which sets forth the organization and administration of disaster response efforts such as debris removal, evacuation and emergency communications, law enforcement, fire protection and rescue, the provision of health care and emergency shelter, allocation of supplies, and the maintenance of critical facilities and infrastructure. The City of Ceres has prepared and adopted a comprehensive multi-hazard functional plan to serve as the City's preparedness plan.

The Draft Area Plan for Emergency Response to Hazardous Materials Incidents in Stanislaus County (August 1993) addresses specific emergency situations related to hazardous materials. The plan assigns emergency operating functions to specific agencies and departments and has designated personnel to serve in the command and control role in the context of a widespread emergency. The plan is very detailed in that it covers all aspects of disasters including health and medical services, law enforcement, traffic control, fire protection, shelter and supply services.

Stanislaus County, as well as various cities throughout the county, adopted this plan because it is rare that one jurisdiction could attain an adequate level of readiness to conduct life saving operations in extraordinary situations. By pooling resources, a better local program could more easily overcome an unfavorable situation and be eligible for various state and federal programs.

9.8.2 CRITICAL FACILITIES

Critical facilities are those facilities and parts of a community's infrastructure that must remain operational after an emergency event, such as an earthquake, flood, or fire, in order for a community to respond effectively. Examples of critical facilities include hospitals, fire stations, electrical power plants, and community facilities. Figure 9-4 shows the location of critical facilities in Ceres. Ability to repair and/or restore such facilities is essential to recovery. Careful planning and rehabilitation of critical facilities is imperative to ensure the health, welfare, and safety of the public.

9.9 FINDINGS

- Although there are several faults near Stanislaus County, the area has not experienced major seismic activity. Activity on major faults outside Stanislaus County, however, suggests that the Ceres area could be affected by activity in those regions. The risk of significant groundshaking in Ceres is relatively low, however, based on historic earthquake activity for the area, and Ceres' geographic location.
- Groundshaking is the primary seismic concern for the city of Ceres. While groundshaking from a major earthquake would be felt in Cere, the risk associated with this hazard in the Ceres area is low, based on historical evidence of earthquake effects in Ceres.
- Smaller, localized flooding on the Tuolumne River north of Ceres, as well as a sudden high rise on Dry Creek, could affect the northernmost part of the Study Area.
- All of the 100-year floodplain falls within the unincorporated part of the Study Area.
- Dam failure can occur under three general conditions: earthquake; structural instability; and rainfall in excess of a dam's holding capacity. The failure of any of the large dams in Stanislaus County is extremely remote.
- Most urban fires are caused by human activity. Modern building codes reduce the potential and severity of urban fires. Urban fire hazards are greatest in areas containing older buildings which do not meet current building codes. The City has a dangerous building abatement program to abate or retrofit hazardous buildings.
- The primary wildland fire hazard in Ceres is the river bluff area in northern Ceres, particularly during the summer months, when the vegetation along the Tuolumne River bluffs is dry.
- Other threats to fire safety involve all of the non-structural items found in buildings, particularly in residences. These items include home furnishings, office equipment, synthetic fibers, plastics, household products, hazardous materials, and appliances. Lack of knowledge about materials which are combustible, and product or structural designs which increase fire risk tend to exacerbate fire risk.
- Utility facilities also constitute potential fire hazards in Ceres. Buried gas lines and overhead electrical power lines can start fires if they break or come down. Major earthquakes, although less likely to occur than a human-induced event, can rupture gas lines or storage tanks, causing severe explosions and fire over a widespread area.
- Ceres participates in mutual aid agreements with other fire protection agencies.
- The Modesto City-County Airport lies north of Ceres, and the airport's overflight zone includes areas within Ceres and the Study Area. The City has adopted an airport overlay zone to limit development in these areas, and to reduce risks in the event of aircraft crash.
- The Stanislaus County *Hazardous Waste Management Plan* (HWMP), August 1993, addresses the treatment, storage, and disposal of hazardous waste in Stanislaus County. The major goal of the plan is to protect public health and environment by promoting the safe use and disposal of hazardous waste. To accomplish this, the plan provides for the reduction of hazardous waste in the county through source reduction, recycling, and on-site treatment methods. Public education and community involvement are key features for obtaining this goal. The HWMP identifies the industrial area in western Ceres as a potentially suitable site for a hazardous waste facility.
- State Route 99, Crows Landing Road, and the Union Pacific and Southern Pacific railroads carry many tons of hazardous wastes through or near Ceres.
- Criminal activity in Ceres has been primarily focused on property, rather than people. The Department of Public Safety promotes and supports various crime prevention programs, including neighborhood watch programs and promotion of defensible space through project design and review.

9.10 PERSONS CONSULTED

Bias, Steve, Zoning Officer/Building Inspector, Building Department, City of Ceres

Garcia, Ted, Program Manager, Hazardous Materials Division, Stanislaus County Department of Environmental Resources

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9.12 GLOSSARY

Active Fault - A fault that has moved recently and which is likely to move again. For planning purposes, "active fault" is usually defined as one that shows movement within the last 11,000 years and can be expected to move within the next 100 years.

Alluvial - Pertaining to or composed of alluvium, or deposited by a stream or running water.

Alluvium - A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its flood plain or delta, or as a cone or fan at the base of a mountain slope.

Beds; Bedding - Layers in sedimentary rocks distinguished from one another on the basis of rock type, grain size, composition, color, etc.

Compaction - Reduction in bulk volume or thickness of, or the pore space within, a body of fine-grained sediments in response to the increasing weight of overlying material that is continually being deposited, or to the pressure resulting from earth movements within the crust. It is expressed as a decrease in porosity brought about by a tighter packing of the sediment particles.

Consolidated Material - Soil or rocks that have become firm as a result of compaction.

Defensible Space - an environment whose physical characteristics – building layout and site plan – function to allow occupants themselves to become the key agents in ensuring their own security.

Earthquake - Perceptible trembling to violent shaking of the ground, produced by sudden displacement of rocks below and at the earth's surface.

Epicenter - An area of the surface of the earth directly above the focus of an earthquake.

Erosion - Movement of material (such as soil) from one place to another on the earth's surface. Agents of movement include water, ice, wind, and gravity.

Fault - A fracture in the earth's crust forming a boundary between rock masses that have shifted.

Fault System - Two or more interconnecting fault sets.

Fault Trace - The intersection of a fault with the earth's surface.

Fault Zone - A zone in which surface disruption or rock fracture has occurred due to movement along a fault. A fault zone may be expressed as an area with numerous small fractures, breccia (essentially, fractured rock) as a fault gouge. A fault zone may be anywhere from a few meters (or yards) to two or more kilometers (1 mile or more) wide.

Fire Hazard Zone - An area where, due to slope, fuel, weather, or other fire-related conditions, the potential loss of life and property from a fire necessitates special fire protection measures and planning before development occurs.

Ground Failure - Mudslide, landslide, liquefaction, or the seismic compaction of soils.

Hazardous Material - An injurious substance, including pesticides, herbicides, toxic metals and chemicals, liquified natural gas, explosives, volatile chemicals, and nuclear fuels.

Inactive Fault - A fault which shows no evidence of movement in recent geologic time and no potential for movement in the relatively near future.

Intensity (of an earthquake) - A measure of the effects of earthquake waves on man, structures, and the earth's surface at a particular place. The intensity at a specific point depends not only upon the strength of the earthquake, or the earthquake magnitude, but also upon the distance from the point to the epicenter and the local geology. Intensity may be contrasted with magnitude, which is a measure of the total energy released by an earthquake.

Landslide - A general term for relatively rapid mass movement, such as slump, rock slide, debris slide, mudflow, and earthflow.

Lateral Spreading - The movement of loose soils over horizontal or low-angle slopes into open areas, caused by ground motion during an earthquake.

Liquefaction - A process by which water-saturated granular soils transform from a solid to a liquid state because of a sudden shock or strain.

Lurch Cracking - The development of all types and sizes of fissures in the ground, due to ground motion during an earthquake.

Magnitude (Earthquake) - A measure of the strength of an earthquake or the strain energy released by it, as determined by seismographic observations. As defined by Richter, it is the logarithm, to the base 10, of the amplitude in microns of the largest trace deflection that would be observed on a standard torsion seismograph at a distance of 100 kilometers from the epicenter.

Potentially Active Fault - (1) A fault that moved within the Quaternary Period before the Holocene Epoch (the last 2,000,000 to 11,000 years); (2) A fault which, because it is judged to be capable of ground rupture or shaking, poses an unacceptable risk for a proposed structure.

Seiche - An earthquake-induced wave in a lake, reservoir, river, or harbor.

Seismic - Pertaining to earthquakes.

Settlement - The downward movement of soils, and structures on them or in them, resulting from reduction in the voids in the underlying soils.

Shear - A kind of fracture (or fault) in rock produced by intense pressure.

Subsidence - The gradual, local settling or sinking of the earth's surface with little or no horizontal motion. (Subsidence is usually the result of gas, oil, or water extraction, hydrocompaction, or peak oxidation, and not the result of a landslide or slope failure.)

Surface Rupture - Break in the ground's surface and associated deformation resulting from fault movement.

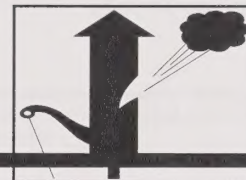
Water Table - The upper surface of saturated earth material below which all the materials are saturated.

Wildland - A nonurban, natural area containing uncultivated land, timber, range, watershed, brush, or grasslands.





CHAPTER 10 NOISE



10.0 INTRODUCTION

The State Office of Planning and Research *Noise Element Guidelines* require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Significant noise sources include traffic on major roadways and highways, railroad operations, airports, and representative industrial activities and fixed noise sources.

Noise modeling techniques and noise measurements were used to develop generalized L_{dn} or L_{eq} noise contours for the major roadways, railroads and fixed noise sources in the Study Area for existing conditions.

Noise modeling techniques use source-specific data including average levels of activity, hours of operation, seasonal fluctuations, and average levels of noise from source operations. Modeling methods have been developed for a number of environmental noise sources including roadways, railroad line operations, railroad yard operations and industrial plants. Such methods produce reliable results as long as data inputs and assumptions are valid. The modeling methods used in this report closely follow recommendations made by the State Office of Noise Control, and were supplemented where appropriate by field-measured noise level data to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site-specific.

A community noise survey was conducted to describe existing noise levels in noise-sensitive areas within the Study Area so that noise level performance standards could be developed to maintain an acceptable noise environment.

Noise monitoring sites are shown on Figure 10-1.

10.1 ROADWAYS

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to develop L_{dn} contours for all highways and major roadways in the Study Area with reported traffic volumes above 5,000 ADT. The FHWA Model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. The current version of the model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour day and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Traffic data representing annual average traffic volumes for existing conditions were obtained from Caltrans and Dowling Associates traffic consultants. Day/night traffic distribution for State Route 99 was based upon 24-hour noise measurement data, and day/night traffic distribution for other major roadways was based upon Caltrans and Brown-Buntin Associates (BBA) data. Truck mix data were based upon Caltrans and BBA file data. Using these data and the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for existing traffic volumes. Distances from the centerlines of selected roadways to the 60 and 65 dB L_{dn} contours are summarized in Table 10-1. Figure 10-2 shows the locations of the 60 dB L_{dn} roadway noise contours.

In some cases, the actual distances to noise level contours may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation. Therefore the distances reported in Table 10-1 are estimates of noise exposure along roadways in Ceres.

TABLE 10-1 NOISE CONTOUR DATA
DISTANCE (FEET) FROM CENTER OF ROADWAY TO L_{dn} CONTOURS

Segment	Description	Existing	
		60 dB	65 dB
State Route 99			
1	South Boundary to Mitchell Road	1511	701
2	Mitchell Road to North Boundary	1669	775
Hatch Road			
3	State Route 99 to Herndon Road	453	210
4	Herndon Road to Richland Avenue	464	215
5	Richland Avenue to Central Avenue	451	209
6	Central Avenue to Moffet Road	429	199
7	Moffet Road to Mitchell Road	404	187
8	Mitchell Road to Boothe Road	281	130
Herndon Road			
9	River Road to Nadine Avenue	72	33
10	Nadine Avenue to Hatch Road	78	36
11	Hatch Road to Evans Way	75	35
12	Evans Way to Whitmore Avenue	60	28
Bystrum Road			
13	Sonora Avenue to Nadine Avenue	65	30
14	Nadine Avenue to Herndon Road	117	54
Richland Avenue			
15	Nadine Avenue to Hatch Road	97	45
16	Hatch Road to Herndon Road	87	40

TABLE 10-1 NOISE CONTOUR DATA
DISTANCE (FEET) FROM CENTER OF ROADWAY TO L₅₀ CONTOURS

	dn	Existing	
Central Avenue			
17	Hatch Road to Richard Way	73	34
18	Richard Way to Caswell Avenue	78	36
19	Caswell Avenue to Whitmore Avenue	74	34
Moffet Road			
20	Hatch Road to Fowler Road	69	32
21	Fowler Road to Whitmore Avenue	93	4
Mitchell Road			
22	River Road to Hatch Road	624	289
23	Hatch Road to Fowler Road	452	210
24	Fowler Road to Whitmore Avenue	442	205
25	Whitmore Avenue to Roeding Avenue	411	191
26	Roeding Avenue to South Boundary	397	184
Morgan Road			
27	State Route 99 to Whitmore Avenue	77	36
Whitmore Avenue			
28	West Boundary to Morgan Road	125	58
29	Morgan Road to Blaker Road	121	56
30	Blaker Road to Herndon Road	162	75
31	Herndon Road to Central Avenue	177	82
32	Central Avenue to Moffet Road	182	84
33	Moffet Road to Mitchell Road	188	87
34	Mitchell Road to Boothe Road	96	45
35	Boothe Road to East Boundary	87	40
Pine Street			
36	Central Avenue to Railroad Avenue	89	41
Service Road			
37	Morgan Road to Blaker Road	100	46
38	Blaker Road to Central Avenue	108	50
39	Central Avenue to Moffet Road	127	59
40	Moffet Road to Mitchell Road	160	74
41	Mitchell Road to East Boundary	108	50
Source: Brown-Buntin Associates, Inc., 1994			

Source: Brown-Buntin Associates, Inc., 1994

The effects of factors such as roadway curvature, and grade can be determined from site-specific traffic noise measurements. The noise measurement results can be compared to the FHWA model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA model. The differences between the measured and predicted noise levels can be used to adjust the FHWA model and more precisely determine the locations of the traffic noise contours.

Table 10-2 has been prepared to serve as a guide when applying the traffic noise exposure contour information presented in this section to areas with varying topography. The table is used by adding the correction factor to the noise level predicted at a given distance. It should be noted that the adjustment factors presented in this table are intended to provide conservative (worst-case) results, and that complex situations should be evaluated by an acoustical consultant where the potential for significant noise impact exists.

TABLE 10-2 TRAFFIC NOISE ADJUSTMENTS FOR VARIOUS TOPOGRAPHIC CONDITIONS

Topographic Situation	Distance from Center of Roadway (Feet)		
	<200	200 - 400	>400
Hillside overlooks roadway	-0-	+1 dB	+3 dB
Roadway elevated (>15')	-5 dB	-2 dB	-0-
Roadway in cut/below embankment	-5 dB	-5 dB	-5 dB
Dense vegetation (100 feet or more)	-5dB	-5dB	-5dB

Source: Brown-Buntin Associates, Inc., 1994

Traffic noise contours were not developed for all roadway segments in the City of Ceres. However, Figure 10-3, prepared using the FHWA Model, may be used to estimate the distance to the 60 dB L_{dn} contour for projected volumes of arterial traffic. For arterial traffic, the predicted distance to the 60 dB L_{dn} contour is determined by the Average Daily Traffic Volume (ADT) and the posted speed limit. L_{dn} contours derived from Figure 10-3 are only indicators of potential noise conflicts, requiring more detailed analysis to determine traffic noise levels at any given location.

10.2 RAILROADS

Railroad activity in the Study Area includes freight activity on the Southern Pacific Transportation Company (SPTCo) track which travels north/south adjacent to S.R. 99. The Atkinson Topeka & Santa Fe (AT&SF) railroad also has a local track servicing industrial areas from Modesto to Turlock, which travels north/south, adjacent to the west portion of Ceres.

Noise measurements were conducted by BBA within the Study Area on January 5-6, 1994. The measurements were conducted to determine the contribution of SPTCo and AT&SF railroad operations to the area noise environment. Each of the monitoring sites was located approximately 50 feet from the centerlines of the tracks. Instrumentation consisted of LDI Model 820B precision integrating sound level meters. The systems were calibrated before use with matching acoustical calibrators to ensure accuracy of the measurements. The purpose of the noise level measurements was to determine typical sound exposure levels (SEL) for railroad line operations in the Study Area, accounting for the effects of travel speed, warning horns and other factors which may affect noise generation. The data thus derived could then be compared to other file data for railroad operational noise levels to better describe the railroad noise environment as it affects the area noise environment, and an annual average L_{dn} could be calculated. At the measurement sites, locomotives and warning horns were the major contributors to railroad noise levels defined by SEL. Based upon the noise level measurements and previous noise level measurements conducted in 1989, the average SEL for freight train operations along the SPTCo railroad track was 103.4 dB at a distance of 100 feet from railroad track centerline, and the average SEL for freight train operations along the AT&SF track was 87 dB SEL at a distance of 100 feet from the railroad track centerline.

SPTCo officials from the Fresno Dispatchers Office report that approximately 18 freight train operations per day occur on the mainline through Ceres. The trains are distributed on a random basis throughout the day. The noise level measurement data confirmed the reported number of freight train operations.

AT&SF officials were not available to report the existing number of freight train operations along the local track. However, AT&SF officials contacted by BBA reported that approximately two local freight trains per day operate in each direction along the local AT&SF track. The noise level measurement data confirmed the reported number of operations along the AT&SF track.

To determine the distances to the 60 and 65 dB L_{dn} railroad contours, it was necessary to calculate the L_{dn} for typical freight train operations. This was done using the SEL values and above-described number and distribution of daily freight train operations. The L_{dn} may be calculated as follows:

$$L_{dn} = SEL + 10 \log N_{eq} - 49.4 \text{ dB, where:}$$

SEL is the mean SEL of the event, N_{eq} is the sum of the number of daytime events (7 a.m. to 10 p.m.) per day plus ten times the number of nighttime events (10 p.m. to 7 a.m.) per day, and 49.4 is ten times the logarithm of the number of seconds per day. Based upon the above-described noise level data, number of operations and methods of calculation, the L_{dn} values for railroad line operations have been calculated, and the distances to the 60 and 65 dB L_{dn} noise level contours are shown in Table 10-3.

TABLE 10-3 APPROXIMATE DISTANCE TO RAILROAD NOISE CONTOURS			
Train Track	L _{dn} , dB, 100 Feet From Tracks	Contour (feet)	
		60 dB	65 dB
SPTCo	68.5	735	341
AT&SF	51.0	25	12

Source: Brown-Buntin Associates, Inc., 1994

10.3 FIXED NOISE SOURCES

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by Federal and State employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components which may be annoying to individuals who live in the nearby vicinity. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas, and to prevent encroachment of noise sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in proximity to noise-producing facilities include mitigation measures to ensure compliance with noise performance standards.

Fixed noise sources which are typically of concern include but are not limited to the following:

HVAC Systems	Cooling Towers/Evaporative Condensers
Pump Stations	Lift Stations
Emergency Generators	Boilers
Steam Valves	Steam Turbines
Generators	Fans
Air Compressors	Heavy Equipment
Conveyor Systems	Transformers
Pile Drivers	Grinders
Drill Rigs	Gas or Diesel Motors
Welders	Cutting Equipment
Outdoor Speakers	Blowers

The types of uses which may typically produce the noise sources described above include but are not limited to: industrial facilities, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.

Numerous industrial facilities are dispersed throughout the Study Area. The following provides descriptions of existing fixed noise sources in the Study Area, and in some cases noise level data associated with their operations are included. The information is intended to be representative of the noise sources and noise levels associated with such uses.

10.3.1 NORTHERN REFRIGERATED TRANSPORTATION, INC.

The Northern Refrigerated Transportation (NRT) trucking terminal is located on the north side of Roeding Road between Mitchell Road and the Ceres Main Canal. This facility was the subject of an acoustical analysis by Brown-Buntin Associates, Inc. in May 1988. According to that analysis, the chief noise sources at NRT are engine and compressor units on refrigerated trailers stored on the property. Noise is also produced by trucks entering and leaving the property. On weekends, 25 to 35 loaded trailers may be stored on the property; 5 to 10 loaded trailers may be stored there on weekdays. The refrigerated units on the loaded trailers are estimated to operate about 60 percent of the time during Summer and 25 percent of the time during the Winter. About 100 to 200 truck trips per day are estimated to occur during weekdays, with about one-half that number on weekends. About 80 percent of the truck trips are estimated to occur during daytime hours.

According to the acoustical analysis, measured L_{eq} values at a distance of approximately 100 feet from the trailers ranged between 54 and 57 dB.

10.3.2 PROCTER AND GAMBLE

This manufacturing plant, located at the corner of Whitmore and Crows Landing Roads, operates on a continuous basis. The major noise sources are fans used for dust collectors, which generate relatively constant noise levels 24 hours/day. Based upon noise level measurements conducted in December 1986, January 1987 and January 1994, the generalized 55 dB L_{eq} contour is located approximately 2,200 feet from the center of the plant complex.

10.3.3 CALIFORNIA VEGETABLE CONCENTRATES

The California Vegetable Concentrates (CVC) plant is located on Whitmore Avenue near the City of Ceres west boundary. The CVC is a food processing plant with noise sources associated with on-site equipment and truck traffic. The majority of on-site equipment noise is associated with boilers and air handling equipment. Measured noise levels in January 1994 indicated that noise levels range between 60 and 63 dB L_{eq} at a distance of 400 feet from the plant.

10.3.4 TIRE AND MUFFLER SHOPS - AT VARIOUS LOCATIONS

Tire and muffler shops were identified by the City of Ceres planning staff as potential stationary noise sources. Major noise sources associated with muffler and tire stores include impact wrenches and hammers, compressors, and tire breakers. BBA conducted noise level measurements of each of these noise sources.

Impact wrenches and hammers produce sound levels of about 89 dB at a distance of 10 feet. The average duration for use of an impact wrench is approximately 15 seconds for each wheel. Pneumatic tire breakers produce significant noise levels due to the release of air pressure through a number of small holes adjacent to the tire sidewall. Noise due to the tire breaker reaches a maximum level of about 105 dB at a distance of 10 feet. The high noise levels due to tire breakers last less than 1 second. Air supply compressors emit about 60 dB at a distance of 50 feet, and are operated intermittently during the work day.

It is not possible to determine a generalized location of an average hourly noise level contour for tire and muffler shops. Noise levels due to these operations vary based upon the locations of the equipment, shielding from building facades and frequency of use.

10.3.5 METAL FABRICATING SHOPS - AT VARIOUS LOCATIONS

Metal fabricating shops were identified by the City of Ceres planning staff as potential stationary noise sources. Major noise sources associated with these types of operations generally include cutting and welding equipment, forklifts and heavy truck traffic. Measured average hourly noise levels from these types of facilities are generally 50 to 55 dB at a distance of approximately 250 feet. The worst case location of a 50 dB L_{eq} contour based upon this limited data would be approximately 450 feet from the noise source.

10.4 AIRPORT NOISE

The Modesto City-County Airport is located north of Ceres. Aircraft operations at the airport are audible in the Study Area, and existing and future operations are identified as a potential noise source within the Study Area.

The Modesto City-County Airport is a basic transport Commercial Service-Primary Airport, which is owned by the City of Modesto. The airport has two parallel runways with headings of 10L/28R and 10R/28L. Based upon *The California Aviation System Plan*, published by the California Department of Transportation, Aeronautics Division in August 1990, there were approximately 206 total based aircraft at the airport, with a total of 117,000 annual operations.

Noise level contours for existing conditions associated with aircraft operations at the Modesto City-County Airport were prepared as a part of the Federal Aviation Administration (FAA) FAR part 150 study. A copy of the airport noise exposure map, as contained in the *Draft EIR/EA for the Modesto City-County Airport Master Plan*, 1988, is shown in Figure 10-4.

10.5 COMMUNITY NOISE SURVEY

A community noise survey was conducted to document noise exposure in areas of the city containing noise sensitive land uses. For that purpose, noise sensitive land uses in the Study Area were considered to include residential areas, parks and schools. Noise monitoring sites were selected to be representative of typical residential conditions in the city.

Short-term noise monitoring was conducted at eight sites on January 5, 1994. Each site was monitored three different times during the day and night so that valid estimates of L_{dn} could be prepared. Two continuous 24-hour noise monitoring sites were established in the City of Ceres as part of the General Plan Update to record day-night statistical noise level trends. The data collected included the L_{eq} and other statistical descriptors. Noise monitoring sites, measured noise levels, and estimated L_{dn} values at each site are summarized in Table 10-4.

Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The community noise survey results indicate that typical noise levels in noise sensitive areas of the Study Area are in the range of 53 dB to 59 dB L_{eq} . Traffic on local roadways and State Route 99, aircraft operations, distant industrial activities and neighborhood activities are the controlling factors for background noise levels in the majority of the study area. In general, most areas of the City of Ceres which contain noise sensitive uses are moderately quiet to noisy, and are representative of an urban environment. The recent measured noise levels are similar to those which were measured in 1989 for the Ceres General Plan Update.

The L_{eq} values in Table 10-4 represent the average measured noise levels during the sample periods. The L_{eq} values were the basis of the estimated L_{dn} values. L_{dn} values show the maximum noise levels observed during the samples. The continuous monitoring data in Figure 10-5 show that ambient noise levels reach a minimum during the hours of 1-5 a.m., increasing during the daytime hours as a function of increased traffic and other human activities.

TABLE 10-4 MEASURED NOISE LEVELS AND ESTIMATED DAY-NIGHT AVERAGE LEVELS (L_{dn}) IN NOISE-SENSITIVE AREAS

Site	Location	Date	Time	Sound Level, dB		
				Leq	Lmax	Est. Ldn
1	S.E corner of Don Pedro Park	1-5-94	11:15	51.2	60.0	53
			15:29	51.5	59.0	
			22:08	46.0	53.5	
2	Parklawn Park	1-5-94	11:40	54.0	71.5	57
			15:03	56.0	69.5	
			22:20	49.5	52.5	
3	Redwood Park	1-5-94	12:10	53.0	59.0	57
			15:57	57.0	63.0	
			22:35	48.5	52.0	
4	Roeding Heights Park	1-5-94	12:31	51.0	65.0	54
			16:19	54.5	61.0	
			22:45	44.0	50.5	
5	Smyrna Park; Near the corner of Fowler Road and Moffet Lane	1-5-94	10:50	53.5	63.5	56
			15:45	51.5	56.5	
			22:10	49.0	51.0	
6	Persephone Park; 200 feet south of Lunar Drive	1-5-94	11:15	48.0	59.5	56
			16:10	51.0	62.0	
			22:25	49.5	51.0	
7	River Park; 150 feet north of River Park Drive	1-5-94	11:45	52.0	60.5	55
			16:30	51.0	60.0	
			22:40	48.0	50.5	
8	Mancini Park; 100 feet west of Herndon Road	1-5-94	12:15	54.0	64.0	59
			16:15	57.0	65.0	
			23:00	52.5	55.0	
9*	1743 Woodworth Avenue	1-5-94 to 1-6-94	11:00 11:00	—	—	57
10*	1404 Paula Nell Court	1-5-94 to 1-6-94	11:00 11:00	—	—	58

* = Continuous Monitoring Site

Source: Brown-Buntin Associates, Inc., 1994

10.6 FINDINGS

- Major transportation sources of noise in Ceres include freeways, other major roadways, and railroads operations.
- Fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas, and to prevent encroachment of noise sensitive uses upon existing noise-producing facilities. The types of uses in Ceres which may typically produce the fixed source noise include industrial facilities, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, sand and gravel operations, and athletic fields.
- The Modesto City-County Airport is located north of Ceres. Aircraft operations at the airport are audible in the Study Area, and existing and future operations are identified as a potential noise source within the Study Area.
- Noise sensitive land uses in the Study Area were considered to include residential areas, parks and schools. Traffic on local roadways and State Route 99, aircraft operations, distant industrial activities and neighborhood activities are the controlling factors for background noise levels in most of the Study Area. In general, most areas of the City of Ceres which contain noise sensitive uses are moderately quiet to noisy, and are representative of an urban environment.

10.7 PERSONS CONSULTED

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Woods, Charlie, Planning and Community Development Director, City of Ceres

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10.9 GLOSSARY

Ambient Noise Level: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

Decibel, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

L_{dn}: Day-Night Average Sound Level. The average equivalent sound level during a 24-hour day obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computer over 1, 8, and 24-hour sample periods.

Note: CNEL and L_{dn} represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum sound level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval. L₁₀ equals the level exceeded 10 percent of the time (L₉₀, L₅₀, etc.).

Noise Exposure Contours: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and L_{dn} contours are frequently utilized to describe community exposure to noise.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure level for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

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